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# THE HANDBOOK OF BRITISH BIRDS

BY

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## VOLUME III

WITH 39 PLATES, TEXT FIGURES AND MAPS

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# PREFACE

THE preparation of this volume has been delayed at various points by lack of complete information, but we have again been fortunate in enlisting the aid of a number of observers with special knowledge of the subjects in question. Among these we have received exceptional and most generous help from Dr. John Berry on many points connected with the geese and ducks and from Mr. Peter Scott regarding the former, while Messrs. G. H. Caton-Haigh, R. A. H. Coombes, C. T. Dalgety and H. L. Popham have also given us most valuable assistance with the geese. Miss E. V. Baxter and Miss L. J. Rintoul have helped us ungrudgingly with the distribution of the ducks in Scotland, and Mr. Hugh Wormald on many points connected with these birds, which he has studied for so many years.

A number of special illustrations are included in this volume. Pictures of all the British species of geese have been expressly painted by Mr. Peter Scott and most generously presented by him for use in the work, and it is a great pleasure to have this opportunity of expressing our gratitude to Mr. Scott for this very delightful gift to ornithology.

The plates of ducks in flight most skilfully drawn by Mr. J. C. Harrison will we are sure be appreciated as an aid to the identification of these birds, often so difficult when viewed on the wing. For assistance and advice in the preparation of these plates we are also much indebted to Mr. Hugh Wormald.

We have to express our gratitude to Mr. L. Tinbergen for allowing us to reproduce in the text some of his excellent sketches of birds of prey in flight which have appeared in his interesting work entitled *Roofvogels*. The plates of these birds by Mr. G. E. Lodge will also we are sure be found most useful.

To assist in the identification of the nests of geese and ducks we have reproduced the two plates of feathers from ducks' nests arranged by the late Heatley Noble and published many years ago in the second volume of the magazine *British Birds*. To complete the series Mr. G. H. Lings has very kindly taken great pains to assemble a series of representative feathers from carefully authenticated nests of the rest of the ducks and also of the geese and these are reproduced in two other plates.

Mr. E. M. Nicholson, whose work in connexion with the enquiries into the status of the Heron by the British Trust for Ornithology is well known, has very kindly drafted the British distribution section for this bird and supplied a map showing the density of its breeding population. For the migration maps of the Mallard, Teal and Wigeon we are indebted to Miss E. P. Leach, while for that showing the breeding distribution of the Eider Miss E. V. Baxter and Miss L. J. Rintoul have kindly supplied the information for Scotland and Mr. T. Russell Goddard and Mr. G. R. Humphreys for Northumberland and Ireland.

In previous volumes we have acknowledged assistance from numerous ornithologists and many of these are continuing their much appreciated help, while in addition the following have most kindly contributed information for the present volume :—

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# THE HANDBOOK OF BRITISH BIRDS.

## VOLUME III.

## Order FALCONIFORMES.

Contains diurnal Raptorial birds. Outwardly recognizable by curved, sharp-pointed bill, cere in which nostrils are situated, and strong, powerful feet and claws, only found otherwise in owls (Strigiformes), which resemble present order by convergence only.

Palate desmognathous, but of an imperfect type in which palatine processes of maxillæ are separated for a considerable part of their length, thus showing transition to schizognathous type, which some forms preserve. Basipterygoid processes functional in sub-order Cathartæ and in *Serpentarius*, absent in adults of all the rest. Cervical vertebræ generally 14; 15 in *Falconidæ* and *Pandion*, 17 in some vultures, *e.g. Gyps*. Sternum may have a pair of foramina or notches (often only one of pair developed), but more often neither. Holorhinal, nares impervious, except in sub-order Cathartæ. Two carotids. Cæca reduced, absent in Cathartæ. Nearly always a well-developed crop, gizzard feebly developed. Syrinx tracheo-bronchial, but obsolete in Cathartæ. Ambiens muscle present. Muscle formula typically A (BXY in *Serpentarius*, (A)XY in Cathartæ). No biceps slip; expansor secundariorum present in Cathartæ, *Falco*, and a few others, absent in rest. Ten functional primaries, the true first being vestigial or (rarely) absent. Usually 12 rectrices (14 in *Neophron*, *Gyps*, and one or two others). Diastataxic. Aftershaft present in Falcones, absent in Cathartæ. Lower tibial feathers elongated except in *Pandion*. More or less underdown present. Powder-down patches present in *Circus*, *Elanus*, *Gypaëtus*, and some others. Oil-gland feathered except in Cathartæ and *Microhierax*. Habits diurnal. Male nearly always smaller than or same size as female. Eggs spotted reddish, in some cases unspotted.

Wetmore recognizes two sub-orders, Cathartæ (New-World vultures) and Falcones.

## Sub-order FALCONES.

In contrast to Cathartæ, which have functional basipterygoid processes, nares pervious, no cæca, aftershaft or proper syrinx, and naked oil-gland, members of present sub-order have basipterygoid processes non-functional except in *Sagittarius*, nares impervious, cæca reduced but present, an aftershaft (except on under-parts of *Pandion*), and feathered oil-gland (except in *Microhierax*). The nestlings have two coats of down, the first ("down A") of "prepennæ" (down formed in continuity with future contour feathers, *cf.* Plate 62, fig. 1), which is soon covered over by "down C"[1]; some of which is formed in continuity with small tufts of "down B" which occur amongst "down A" and which "down C" pushes out (*cf.* Plate 62, fig. 2).

## Family FALCONIDÆ.

Vomer ending anteriorly in an oval swelling touching the maxillo-palatine processes. Palate directly desmognathous (maxillo-palatine processes united directly). Palatal surface of upper mandible with longitudinal ridge. Always 15 cervical vertebræ. Coracoid with well-developed procoracoid process curving over to articulate with furculum. A fossa in the mandible or at least a thinning of the bone. Sternum with spina interna as well as externa. Syrinx with large external tympaniform membrane on which the intrinsic syringeal muscles are inserted. Eggs always heavily blotched and spotted red-brown, no green internally.

---

[1] The down which we call "C" is commonly stated to consist of "preplumulæ," *i.e.* to be formed in continuity with the definitive adult down-feathers (plumulæ), but I can find no evidence of such continuity (see description of nestling under Peregrine). *H.F.W.*

### Genus FALCO L.

FALCO Linnæus, Syst. Nat., ed. x, i, p. 88 (1758—Type by subsequent determination in Check-List N. Amer. B., 2nd ed. 1886, p. 193 : *Falco subbuteo* L.).

Contains all real falcons, including peregrines, merlins, kestrels, gyr-falcons, etc., the various groups not presenting sufficient characters for generic separation. Upper mandible with sharp " tooth " and corresponding notch in lower mandible. Nostrils free, round, with tubercle in middle. Second visible primary longest, sometimes (Merlin) 2nd and 3rd, 1st visible or 1st and 2nd with abrupt, strongly-marked attenuation before tip of inner web. Tarsus almost entirely bare. Eggs yellowish internally if held against light. Cosmopolitan.

*PLATE 61.*

## 256. THE GYR-FALCON—Falco rusticolus rusticolus L.

FALCO RUSTICOLUS Linnæus, Syst. Nat., ed. x, i, p. 88 (1758—Sweden : *cf.* Fauna Suecica, ed. ii, p. 19, No. 56).
*Falco gyrfalco* Linnæus,[1] Saunders, p. 345.
*Falco rusticolus rusticolus* L., Pract. Handb., ii, p. 101.

**Habitat.**—Frequents open country in vicinity of cliffs and rocky fells, but also forested regions, and rarely strays far south of breeding-grounds. *B.W.T.*

**Field-characters and General Habits.**—Gyr-Falcons are *larger, slightly longer tailed, more uniform-looking and generally paler birds than Peregrine, with moustachial stripe obscure or lacking. The flight is Peregrine-like, but with wing-beats considerably slower.* Typical race is darkest of the several forms, with head, especially, darker than Iceland Falcon and sometimes fairly distinct moustachial mark ; upper-parts with broadly blotched and barred pattern of dark and light grey, under-parts whitish with blackish streaks, flanks barred. Young birds browner, not separable from young Iceland Falcons. Length *c.* 20–22 ins. ; female larger than male.

General habits like Peregrine, securing prey both by stoop from a height and pursuit, but appears to catch small mammals more than that species. Perches both on crags and trees. *B.W.T.*

**Voice.**—Probably does not differ from that of Iceland Falcon (*q.v.*). A. E. Brehm describes a loud trilling cry at nest, louder than Peregrine's. *B.W.T.*

**Breeding.**—Normally breeds on ledges of cliffs, but J. Wolley records cases of nests in trees being occupied. *Nest.*—Usually merely a few sticks or twigs with moss, down, and dead grass as lining, but in some cases said to be substantial, built of good-sized branches and lined with tufts of dead grass. Such are no doubt in first instance old nests of Rough-legged Buzzard or Raven. Bones of victims lying about ; also accumulation of pellets and excrement, the same site being used for many years in succession. *Eggs.*—

---

[1] Prof. E. Lönnberg has shown (*Ibis*, 1931, p. 306, Plate xii) that Linnæus's *F. gyrfalco* (1758, p. 91) was really a Goshawk.

4, less frequently 3, very rarely 5: blunt oval in shape, washed with yellowish- or tawny-brown and with numerous darker reddish-brown spots. Some have pinkish or purplish tinge, and others show more or less of the white ground: single eggs entirely white. Not nearly so richly coloured as Peregrine's eggs in a series. Average of 100 eggs (23 by Rey), 58·69×45·65. Max.: 62·6×46 and 57·3×48·5. Min.: 55×45·7 and 56×43 mm. *Breeding-season.*—During second half April, but incubated eggs may be found in May, and exceptionally early in April. They are laid at intervals of 3 days. *Incubation.*—By female usually, but male also said to take some part (P. Rosenius). Period 28 days (I. Hortling). *Fledging.*—Male provides food: brought in feet and delivered to female. One brood. *F.C.R.J.*

**Food.**—In Scandinavia chiefly Ptarmigan (*Lagopus mutus*), Willow-Grouse (*L. lagopus*) and near the coast, auks. Other species recorded are: Meadow-Pipit, Fieldfare and other thrushes, Lesser White-fronted Goose, many *Limicolæ* (Whimbrel, Lapwing, Golden Plover, etc.), Capercaillie, and Black Grouse. Mammals include, lemming (frequently), leveret, squirrel, etc. A Sussex specimen had killed a pigeon. *F.C.R.J.*

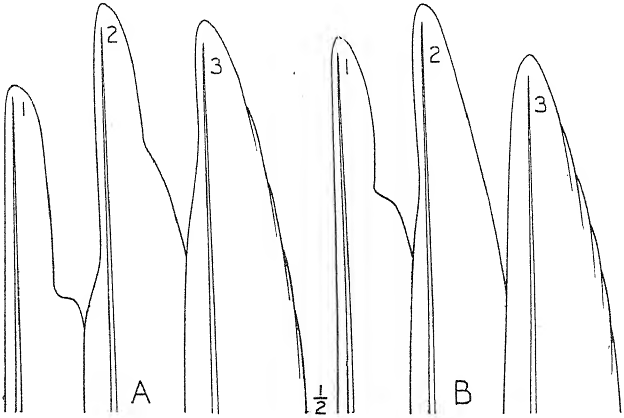
**Distribution.**—*England.*—Very rare vagrant. Two admitted by Saunders:—Adult, Mayfield (Sussex), Jan., 1845, and young, Orford (Suffolk), Oct., 1867. [One Thetford Warren (Suffolk) spring 1883 considered by Newton probably, but not certainly, of this form, may have been Iceland. One recorded doubtfully Hatfield Broad Oak (Essex) Dec., 1901, had no emargination on inner web of 2nd primary and 1st primary was longer than 3rd (G. E. Lodge) and was certainly a dark female Peregrine.] *H.F.W.*

**Distribution Abroad.**—A Holarctic species. Typical race is resident in Norway (Trondelag in small numbers, more general Nord-Norge to 70°), N. Sweden, south to W. Jamtland, N. Finland and N. Russia (Murman coast, Kanin, etc.), but replaced in Siberia by other races from R. Petchora to Bering Straits and by other forms in Iceland, N. Greenland and E. Canada, Labrador, etc. Typical race wanders south to Baltic, Denmark, and central Russia. Accidental Heligoland, Belgium, Holland, Germany, Switzerland, Austria, Poland, Baltic states, and S. Russia. Also (subsp. ?) recorded Novaya Zemlya and Waigatz. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head white, finely streaked black; crown dark slate-brown, feathers with blackish shaft-streaks; feathers over eyes and down sides of back of crown with narrow, and those of nape with wider, buffish-white edgings; feathers of mantle and scapulars dark slate-brown with blackish shafts and barred pale bluish-slate; back, rump, and upper tail-coverts paler slate-blue with black-brown shaft-streaks and brown-slate bars; (*sides of head*) ear-coverts and cheeks dark brown streaked white, sometimes with ill-defined moustachial stripe; (*under-parts*) chin white; throat and upper-breast white, feathers with drop-like streaks of dark brown; lower-breast and belly with larger dark brown spots; flanks, axillaries, and under wing-coverts white broadly barred dark slate-brown; under tail-coverts same but bars considerably narrower; *tail-feathers* slate-grey, slightly mottled brown and closely barred brown, narrowly tipped dull white; *outer primaries* dark brown, outer webs mottled dull white, and inner webs with comb-like barring of dull white more or less mottled brown, *inner primaries* and *secondaries* barred slate, mottled with brown; *wing-coverts* as mantle. Only moulting adults examined were dated April and May and in these inner primaries were partially grown but there was no body-moult.

NESTLING.—Down white with a slight creamy tinge, rather short, covering bird well on upper-parts, but thinly on sides of belly and bare patch at base of sides of neck. (Only a very young bird examined.)

JUVENILE.—(*Upper-parts*) crown dark brown with more or less buffish-white edgings to feathers, occasionally all over but usually confined to sides of crown ; nape with more white as in adult ; upper mantle usually uniform dark brown, rest of mantle and scapulars dark brown, feathers with brownish-white edgings and spots ; back, rump, and upper tail-coverts with rather larger spots and edgings, often forming bars on upper tail-coverts ; (*under-parts*) chin white, streaked dark brown ; rest of under-parts very widely streaked dark brown feathers of flanks mostly dark brown with white edgings and spots ; under tail coverts less widely streaked usually with dark brown spots and shaft-streaks ; axillaries and under wing-coverts dark brown edged with large white spots and streaks ; *tail-feathers* dark brown with dull buffish incomplete bars, paler and more distinct on inner webs of all feathers except central pair, tips of feathers whiter ; *primaries* dark brown with a few buff spots on outer webs and comb-like buff bars on inner webs, *inner primaries* and *secondaries* more spotted on outer webs and with comb-like bars on inner incomplete and much mottled ; *wing-coverts* dark brown spotted with brownish-white or buff on edges as scapulars. Some have no light spots on mantle, scapulars, and wing-coverts and are much darker on under-parts.



Tips outer three visible primaries of A. Gyr-Falcon, *Falco r. rusticolus*; B. Peregrine Falcon, *Falco p. peregrinus* to show differences in comparative lengths and in emarginations of outer and inner webs.

FIRST WINTER.—Like juvenile. FIRST SUMMER.—No juvenile examples in actual moult have been examined, but moult is probably like that of Iceland Falcon.

MEASUREMENTS AND STRUCTURE.—♂ wing 350–372 mm., tail 195–215, tarsus 50–61, bill from cere (see vol. i, p. xxxiv) 23–24 (5 adults measured). ♀ wing 385–413, bill 25–27, tail 235–265 (9 adults measured). Primaries (1st vestigial one not included) : 2nd longest, 1st 19–25 mm. shorter (usually shorter than 3rd, occasionally equal, but not longer), 3rd 6–10 shorter, 4th 20–30 shorter, 5th 45–47 shorter ; 2nd and 3rd emarginated outer webs, 1st very abruptly emarginated and attenuated near tip of inner web and 2nd not so abruptly. Rather more than half tarsus feathered. Rest of structure as Peregrine Falcon.

SOFT PARTS.—Bill bluish-horn, darker at tip, yellowish at base ; cere, legs, and feet bright yellow in adult, bluish to greenish-grey in young ; iris dark brown.

*H.F.W.*

**Characters and allied forms.**—For differences of *F. r. islandus* and *candicans* see under those forms. Forms of *F. rusticolus* may be distinguished from *F. peregrinus* by their larger size, want of definite moustachial stripe, and 2nd primary being emarginated on inner web. Briefly Gyr-Falcon is usually darker on crown and mantle than Iceland and Greenland, and is smaller; some Greenland Falcons are like Iceland but most are very much whiter. While most Iceland are dark, they vary individually, and a Greenland-like young and an Iceland-like young have been found in the same eyrie (G. E. Lodge). Very dark brown juvenile Iceland and Greenland (*Hierofalco holboelli* Sharpe) are usually not quite as blackish as darkest juvenile *F. r. rusticolus*, while both juvenile and adult *F. r. obsoletus* (Labrador) [1] are usually even darker than *F. r. rusticolus*. Other races from Siberia and Altai have been separated, but in all these races there is great individual variation and they can only be separated as sub-species on account of the relative abundance of certain types in certain areas. *H.F.W.*

*PLATE 61.*

## 257. THE ICELAND FALCON—Falco rusticolus islandus Brünn.

Falco Islandus Brünnich, Orn. Bor., p. 2 (1764—partim, No. 9 only. Brünnich doubtfully united the white and grey falcons, stating that the various varieties were brought to Denmark by the Icelanders. From Kerr—1792—onwards *islandus* has generally been restricted to the grey-backed Iceland form. Latham (Gen. Synops. Suppl., 1787, p. 282) applied the name to a white bird, but definitely gave the habitat as Iceland (*op. c.*, vol. i, p. 84)).
*Falco islandus* J. F. Gmelin, Yarrell, i, p. 46 (part); Saunders, p. 343.
*Falco rusticolus islandus* Brünn., Pract. Handb., ii, p. 103.

**Habitat.**—Desolate, rocky and mountainous country, both near sea and far inland, but especially in vicinity of sea-bird colonies; in its hunting excursions may be seen occasionally in any sort of country existing in Iceland (B. Hantzsch). *B.W.T.*

**Field-characters and General Habits.**—A paler bird than Gyr-Falcon and rather larger, with whitish head, streaked blackish, and no moustachial stripe, but occasional dark individuals could not be distinguished in field from that race and some of the less white examples of Greenland Falcon are not separable even in hand. For general characters of species see Gyr-Falcon. Wings falling short of tail by nearly two inches give different appearance at rest from Peregrine, but in air wings appear almost as long as Peregrine's, but broader and blunter (E. Vesey); these features would apply also to the other races. Length *c.* 21–24 ins.; female larger than male.

General habits as Gyr-Falcon. Flight in pursuit of prey described as exceedingly swift and powerful (Vesey), in accordance with its reputation amongst falconers, but *cf.* under Greenland Falcon. *B.W.T.*

**Voice.**—Like most falcons is a decidedly silent bird outside breeding season, but unlike Peregrine is also as a rule very silent at nest, though exceptions occur (E. Vesey). Notes are a penetrating "kyak" not unlike Peregrine (both sexes), and more rarely a higher "gik," as well as a loud trilling "giii - - -" (B. Hantzsch). *B.W.T.*

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[1] By the courtesy of the Royal Scottish Museum I have examined a very dark young female taken on the island of Stroma, Pentland Firth (Orkney), on July 25, 1926, and recorded as an example of *F. r. obsoletus* (E. R. Paton, *Scot. Nat.*, 1926, p. 137). This is like dark birds from Labrador (except that the under tail-coverts are not so strongly marked), but as some Iceland specimens resemble it (notably one taken out of an eyrie and now in Mr. G. E. Lodge's possession) it is impossible to determine its origin. *H.F.W.*

**Breeding.**—In absence of trees, necessarily a cliff breeder. *Nest.*—Often no true nest beyond a few twigs, stalks, and accumulation of pellets, excrement, feathers and remains of prey, but at times substantially built nest of heather stalks and twigs, almost certainly that of Raven. *Eggs.*—Usually 3–4, 5 occasional and 6 recorded, closely resembling those of Gyr-Falcon, but somewhat lighter on average: exceptionally quite white. Average of 100 eggs, 59·09×46·38. Max.: 64×48·26 and 60·1×49·3. Min.: 53·8×44·2 and 57·5×41·8 mm. *Breeding-season.*—Latter part of April and first half of May. Eggs laid at intervals of about 3 days. *Incubation.*—Almost entirely by female: male generally on guard above nest, bringing food in feet from time to time to hen. (F. Faber however asserts that male regularly relieves his mate.) Hantzsch says on fine mornings both leave eyrie and perform evolutions in air and even hunt in company. Period probably not less than four weeks. *Fledging.*—Male provides all food for young and mate, latter remains at nest and breaks up prey and feeds young. Period: at 47 days young still retain down and have quite short tails (J. H. Sherlock). Only one brood possible in season, but will lay again if first clutch is taken. *F.C.R.J.*

**Food.**—In Shetlands recorded killing Rock-Dove and domestic pigeon. In Iceland mainly Rock-Ptarmigan (*Lagopus m. islandorum*): also ducks (Mallard, Eider, Red-breasted Merganser, etc.): Limicolæ (Whimbrel, Golden Plover, Ringed Plover, Red-necked Phalarope, etc.), auks (Guillemot, Black Guillemot, Puffin, etc.): gulls (chiefly Kittiwake), and Fulmar. Occasionally also small birds (Snow-Bunting). *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. Identified examples obtained from time to time (generally in winter) in Northumberland, Westmorland, Yorks, Salop, Scilly Is., and possibly Lincs and Suffolk (see Gyr-Falcon); in Shetlands, Orkneys, O. and I. Hebrides, and several localities Scottish mainland. Five times in N. and W. Ireland. *H.F.W.*

**Distribution Abroad.**—Iceland, but birds from S. Greenland are indistinguishable. Occurs in Færoes: possibly some Continental European records due to this form. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Occasionally very difficult to distinguish from *F. r. rusticolus*, crown being only slightly more streaked with whitish, nape rather whiter and rest of upper-parts with paler slate-grey bars. (*Upper-parts*) usually crown creamy-white streaked black-brown, nape white with irregular black-brown markings, rest of upper-parts and tail with ashy-grey bars much paler than in *F. r. rusticolus*, sides of head, ear-coverts, and cheeks white streaked black-brown, *under-parts* as in *F. r. rusticolus*, but often with finer black streaks and smaller spots. *N.B.*—There is considerable variation; see also under Greenland Falcon. This plumage is acquired by complete moult from June to January.

NESTLING.—Downs as in Peregrine Falcon (*q.v.*), but downs (A) and (C) are white and not creamy or grey.

JUVENILE.—Sometimes like that of *F. r. rusticolus*, but (*upper-parts*) usually crown and nape with considerably more white, being usually white thickly streaked dark brown; feathers of mantle, scapulars, and *wing-coverts* usually with whiter edgings; upper tail-coverts with more definite whitish bars; (*under-parts*) ear-coverts and cheeks usually with more white; *tail-feathers* also more definitely barred white; comb-like barring on inner webs of *primaries* whiter. *N.B.*—Dark and light birds have been taken in the same eyrie (G. E. Lodge).

FIRST WINTER.—Like juvenile. FIRST SUMMER.—The juvenile plumage is completely moulted from June (sometimes almost complete by July, when bird is about a year old) to January. New plumage like that of adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 366–380 mm., tail 190–210, tarsus 57–69, bill from cere 23–27 (11 adults measured). ♀ wing 410–430, bill 26–29 (12 adults measured). Primaries (1st vestigial one not included): 2nd longest, 1st 12–17 mm. shorter, 3rd 8–12 shorter, 4th 25–30 shorter, 5th 45–55 shorter; 2nd and 3rd emarginated outer webs, 1st very abruptly emarginated and attenuated near tip of inner web and 2nd not so abruptly. Rest of structure as Peregrine Falcon.

SOFT PARTS.—As Gyr-Falcon. *H.F.W.*

*PLATE 61.*

## 258. THE GREENLAND FALCON—Falco rusticolus candicans Gm.

FALCO CANDICANS Gmelin, Syst. Nat., i, p. 275 (1788—"Habitat in Islandia et Scotia boreali"! As Gmelin distinguished between the white *candicans* and the dark *islandus*, the former name has generally been restricted to the Greenland form, though Gmelin did not know its real habitat).
*Falco candicans* J. F. Gmelin, Yarrell, i, p. 36; Saunders, p. 341.
*Falco rusticolus candicans* Gm., Pract. Handb., ii, p. 105.

**Habitat.**—In breeding-season in Arctic chiefly frequents rocky coasts. In winter many remain in far north, but others wander farther afield, occurring in variety of open country, much as Peregrine, but chiefly, as far as Brit. Is. are concerned, wild and rugged coasts and islands. *B.W.T.*

**Field-characters and General Habits.**—Typical Greenland Falcon, being *pure white with black markings*, cannot be confused with any other bird, except perhaps at long range with Snowy Owl, from which smaller head, pointed wings, and typical rapid falcon flight distinguish it, but other Greenland birds cannot be separated from Iceland Falcon and all intermediates occur. Size and habits as Gyr and Iceland Falcons, but notwithstanding great reputation of these races with falconers for speed and strength, observers with experience of present race speak rather disparagingly of its powers, finding it relatively slow and not particularly agile. In S.W. Greenland it appears to live largely on small Passerines taken by surprise and helpless young of larger birds (E. M. Nicholson). Same observer describes Snow-Bunting successfully eluding it, while A. L. V. Manniche and A. T. Hagerup found pigeons more than a match for it. *B.W.T.*

**Voice.**—Not known to differ from other races. Described as rattling, piercing screams "gyak" and "ke-a ke-a ke-a" repeated more and more rapidly till the syllables merge into rattling scream (E. H. Forbush). A note described as "a not loud quivering, lengthened tune" (A. T. Hagerup) is presumably trilling note described in other races. Food-call of fledged young is a harsh, querulous mewing note (E. M. Nicholson). *B.W.T.*

**Display and Posturing.**—Apparently no record of sexual display, but E. M. Nicholson records family play after breeding-season, with turning on back and (once) "looping the loop." *F.C.R.J. & B.W.T.*

**Breeding.**—Necessarily a cliff-breeder, nesting beyond tree limit. *Nest.*—None, but as same site is occupied year after year, excrement and remnants from meals, pellets, bones, feathers or fur accumulate till they form a large whitish-yellow mass, sometimes visible 3 kilometres away (A. L. V. Manniche). *Eggs.*—Usually 3 or 4: five once recorded: closely resembling those of other Gyr-Falcons, but in a series darker than those of Iceland Falcon. Average of 90 eggs (11 by E. Hartert), 58·78×45·74. Max.: 63·8×47 and 60·7×49·5. Min.: 53·5×44·5 and 56·9×41·4 mm. *Breeding-season.*—Varies somewhat according to latitude: recorded in late April and early May on W. coast, but not till near end of May on N.E. side. *Incubation.*—Only female seen brooding: period about 29 days (Manniche). *Fledging.*—Food apparently provided by male: period not ascertained. One brood only possible. *F.C.R.J.*

**Food.**—In Brit. Is. recorded as taking mammals (rabbit, water-vole): birds: (Snow-Bunting, Sky-Lark, Rock-Dove, domestic pigeon, Golden Plover, Ringed Plover, Dunlin, Snipe, etc., and Kittiwake). In Greenland, mainly lemmings: also alpine hare: Ptarmigan, Little Auk, Guillemot, Mandt's Guillemot, Arctic Tern and Kittiwake, Fulmar, Eider, Purple Sandpiper, Turnstone, Ringed Plover: Snow- and Lapland Buntings. *F.C.R.J.*

**Distribution.**—*British Isles.*—Irregular winter- and spring-visitor (sometimes May), chiefly Scotland (especially islands) and Ireland (especially N. and W. coasts), occasionally N. England, and elsewhere very rarely, *viz.*:—Denbigh, Brecon, Carmarthen, Pembroke, Norfolk, Suffolk, Sussex, Wilts, Somerset, Devon (mainland) and Lundy, Cornwall and Scilly Is. *H.F.W.*

**Distribution Abroad.**—Breeds on both W. and E. coasts of N. Greenland: in south breeding birds resemble *F. r. islandus.* Also E. Arctic Canada. On passage Jan Mayen, Iceland, Færoes, and E. Canada. Accidental in Norway, Sweden, Finland, Heligoland, W. Germany, Baltic states, Holland, Belgium, France, and Portugal. In N. America to Nova Scotia and Maine. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Some examples indistinguishable from *F. r. islandus.* Others very similar but whiter on crown and nape, with white or whitish instead of pale grey bars on *upper-parts* and *tail* and many fewer and finer black markings on *under-parts.* From such examples every gradation to individuals entirely white on *under-parts*; (*upper-parts*) crown and nape white with a few fine black shaft-streaks; mantle, scapulars, wing-coverts, back and upper tail-coverts white with black restricted to broad spots or incomplete bars not entirely crossing feather; *tail-feathers* pure white or with shafts, frecklings, and a few spots of dark brown; *wing-feathers* white with shafts, subterminal bands, and a few spots and mottlings of dark brown. This plumage is acquired by complete moult from June to January or even February.

JUVENILE.—Some examples as dark as juvenile *F. r. rusticolus* or *F. r. islandus.* Others considerably whiter on crown; rest of *upper-parts* with white or buffish-white edgings and spots and usually bars on scapulars; *tail* more widely and evenly barred white; *under-parts* more finely streaked dark brown. From such examples there is, as in the adult, complete gradation to individuals entirely white on *under-parts* or with only a few fine brown streaks; (*upper-parts*) crown and nape white with dark brown shafts; mantle, scapulars, and wing-coverts white with dark brown shafts and brown streaks usually more or less drop-shaped; *tail* white; *wing-feathers* as adult white form but usually more barred with dark brown. Such birds are distinguishable from adults by having streaks instead of bars on upper-parts and these are usually paler brown and not so blackish.

FIRST WINTER.—Like juvenile. FIRST SUMMER.—The juvenile plumage is completely moulted from June (when bird is about a year old) to December, moult being sometimes nearly complete as early as July. New plumage like adult and moulting specimens examined show that dark juveniles moult into dark adult plumage and whiter juveniles into white adults.

MEASUREMENTS AND STRUCTURE.—♂ wing 360–405 mm., tail 190–225, tarsus 60–71, bill from cere 23–25 (12 adults measured). ♀ wing 400–425, bill 25–28 (20 adults measured). Primaries (1st vestigial one not included): 2nd longest, 1st 15–25 mm. shorter, 3rd 2–10 shorter, 4th 25–30 shorter, 5th 45–50 shorter; 2nd and 3rd emarginated outer webs, 1st very abruptly emarginated and attenuated near tip of inner web and 2nd not so abruptly. Rest of structure as Peregrine Falcon.

SOFT PARTS.—As Gyr-Falcon. *H.F.W.*

*PLATES 61, 65a, and 66.*

## 259. THE PEREGRINE FALCON—Falco peregrinus peregrinus Tunst.

FALCO PEREGRINUS Tunstall, Ornithologia Britannica, p. 1 (1771—Ex Brit. Zool., p. 136—Great Britain).
*Falco peregrinus britannicus* Erlanger, Journ. f. Orn., 1903, p. 296 (England).
*Falco peregrinus* J. F. Gmelin, Yarrell, i, p. 53; *F. peregrinus* Tunstall, Saunders, p. 347.
*Falco peregrinus peregrinus* Tunst., Pract. Handb., ii, p. 107.

**Habitat.**—In Brit. Is. frequents chiefly open more or less treeless country. In breeding-season, vicinity of coastal or inland cliffs, moors, fells, and mountain-sides; also locally inland in more cultivated or wooded country where suitable nesting-sites are available. Occasionally frequents high buildings, such as church spires. Outside breeding-season ranges more widely, occurring about estuaries, marshes, and open country generally, often far from any breeding-haunts, and at times even in tolerably well-wooded localities. On Continent also breeds regularly in forested country (conifers preferred) in plains and mountains. *B.W.T.*

**Field-characters and General Habits.**—Falcons are characterized by quick dashing flight and pointed wings. Peregrine is largest British breeding species. On wing a compact, robust-looking bird with *long sharply pointed wings, medium-length, rather tapering tail,* and very characteristic flight, swift and direct, with *few rapid, winnowing beats alternating with long glide on extended wings*; action often not unlike pigeon. At rest dark, blue-grey upper-parts, crown and sides of head and well-marked moustachial stripe almost black, and buffy-white under-parts barred black are distinctive. Female, in addition to larger size, is usually more heavily barred below and often rather darker above. Barring may be inconspicuous in some adult males. Young birds (juvenile to first winter) browner above, with under-parts streaked, not barred. Length *c.* 15–19 ins.; female larger than male.

Perches chiefly on rocks, commonly on some ledge or pinnacle of cliff, in upright attitude with head sunk between shoulders, sometimes on eminence on ground or on building, fence, post or tree, last being sometimes used as look-out. Swift and powerful on wing, Peregrine typically strikes down prey by magnificent headlong stoop at almost incredible speed, with wings folded, but held slightly out from sides, and producing rushing sound out of all proportion to its size ; shooting upwards immediately after striking victim and usually circling round a few times before descending to the kill. Mode of hunting has several variations. Peregrine may have been circling quietly round and stoop straight at quarry passing below. Or it may spot prospective victim at a distance, either from air or from look-out on cliff or other elevation, in which case a pursuit takes place, the falcon rising above quarry preparatory to stoop. These tactics may be repeated again and again if, as sometimes happens, the hunted bird is agile enough to elude the stoop by sudden swerves and zigzags. Sometimes it escapes by dropping to or flying just above water or ground, when Peregrine will not normally strike. As variant to typical stoop described above, falcon will at times " bind " to quarry in mid-air—*i.e.* grip it as it strikes, and sometimes birds are pursued and seized without stoop ; occasionally it will throw up on back and seize or strike bird *from below*. Exceptionally it may snatch a victim from topmost twigs of tree or from projecting point of cliff as it sweeps past (J. W.-Bond), and occasionally young rabbits or other small mammals, or exceptionally even birds, are taken from ground. Hawking for large insects, which are caught with claws and eaten on wing after fashion of smaller falcons, has also been described (M. Bartels). Dive with almost closed wings, much like stoop at prey, may also be employed in alighting, wings being spread at last moment. Occasionally it will hover for a few seconds. Has usually special plucking places to which prey is carried, and cliff tops or ledges near eyrie may be littered with remains of birds. Away from cliffs any spot on open ground, but preferably some little eminence, will serve. Plucks fairly thoroughly. Head is usually torn off and eaten and carcass left with breast-bone uppermost and well cleaned, generally with shoulder girdle and wings attached. Large quills usually not pulled out (L. Tinbergen). Generally seen singly or in pairs, evidently pairing for life. Pairs are not often seen hunting together, but instances are recorded of two birds in winter far from any breeding-place co-operating in hunting ; thus R. W. Calvert repeatedly observed one bird flying low over tree-tops and frightening pigeons off boughs, while the other " waited on " and stooped. Roosts usually on cliffs and crags, sometimes in most exposed situations, and occasionally on tall buildings ; on Continent also regularly in forest trees (Naumann). Typical pellets measure about 40–45 × 22–25 mm. (though some are much smaller) and often taper at one end. *B.W.T.*

**Voice.**—Often very noisy when breeding-place invaded, especially when young in nest or fledged. Main cries are a shrill, chattering " kek-kek-kek-kek - - - " and a hoarse, almost quacking " kwaahk-kwaahk-kwaahk - - - " of more intense excitement ; a clear, drawn-out, plaintive cry, rising very slightly at the end, mainly a call or recognition note ; and a note rendered " *wee*chew " in case of American form (J. A. Hagar), varying a good deal in quality, but typically rough and creaky (like a very rusty hinge : Hagar), though sometimes more smooth-sounding, a display or " conversation " note. The " kek " and " kwaahk " notes generally appear distinctly lower-pitched in falcon than in tiercel, though some competent observers have maintained that there is not a constant difference. A somewhat Jackdaw-like " kyack," " kyick," " kyackyick," etc., used especially in feeding young (L. Schuster) is evidently a distinct note, and a long-drawn, whining " keearrk," a single grunting "ugh" of fear, an almost Jay-like squawk when attacked by another bird, a penetrating "cha-chek," "chuck-chick" and variants or single "chick," which may be rapidly repeated (J. W.-Bond), a disyllabic "kwot-ik" in courtship, and a squealing "kree-lee" from a female returning to eggs (D. N.-Thompson) are also mentioned, but some may be only variants of the above. Note of eyases a low chittering or squeaking rendered "hek-herrech-kerrech" (W.-Bond). Usually silent outside breeding-season, but an almost musical "gü͞oo-gü͞oo - - -" is recorded from birds playing in the air in winter (A. Voigt). *B.W.T.*

**Display and Posturing.**—Most connected account of display in this species has been given for American race (*F. p. anatum*) by J. A. Hagar. Unattached females appear to wander in search of mates, while unmated males occupy suitable cliffs and on appearance of female seek to attract her by flying excitedly from one ledge to another, alighting for a moment on each one and then swinging along to next, with accompaniment of "rusty hinge" note (see p. 10). Account is probably also applicable to present race, as D. N.-Thompson has seen tiercel in March making short flights up and down cliff-face, going from ledge to ledge and hollow to hollow in precisely the manner described and with same note, though no female was present. When paired, birds indulge in varied gambols and evolutions in air, soaring in wide circles either independently or both together, flying in long switchback undulations, playfully stooping at one another (generally male at female, but sometimes the reverse), caressing bills in air, or tumbling and diving with half-closed wings in almost Raven-like fashion (J. W.-Bond, N.-Thompson). Hagar gives vivid description of such a display in American form, culminating in terrific dive, at end of which bird "looped the loop" three times in succession, turning completely upside down at top of each loop. Coition observed when male chased female into small cave and mounted her on edge of this; accompanied by subdued chittering cries (N.-Thompson). J. W.-Bond describes attempted coition in air. Nest-relief accomplished with much noise (L. Schuster). *F.C.R.J. & B.W.T.*

**Breeding.**—In Brit. Is. eggs are usually laid in scrape, on ledge or hole in cliff, no nesting material being used, but at times annexes old nests of Raven, Hooded Crow, Jackdaw, or Herring-Gull (D. N.-Thompson). In south chiefly on sea-cliffs, but inland sites more common in mountainous districts of Wales and Scotland. Attempted to breed for two years in succession on open heath near pine in Hants, and has also occasionally nested on lofty buildings and among heather on small islets off coast. (On Continent frequently makes use of old nests in trees of Raven, Heron, Rook or other raptorial bird, and in northern localities often lays on ground in marshes or on tops of high river-banks.) *Eggs.*—Usually 3 or 4, 2 usually minimum, but one recorded: 5 rare, but 6 said to occur, both at home and abroad. Shape blunt oval, ground generally covered by red-brown markings, varying from orange-tawny to deep red or brown-red. In some varieties a good deal of white ground is visible and there are many lilac and ashy shell-markings: exceptionally pure white eggs recorded. Average of 100 British eggs, 51·8 ×41. Max.: 58·6×43·8 and 49·8×44·2. Min.: 46×38·2 mm. *Breeding-season.*—On S. coast may lay 1st or 2nd week April, exceptionally late in March, but in north and in mountains from mid-April to early May. Eggs laid usually at intervals of 2 days, sometimes 3 and rarely more. *Incubation.*

—By both sexes, but falcon takes greater share and is fed at times by tiercel, the falcon leaving the nest at his call and receiving prey in the air in her feet from the male or catching prey after it has been dropped. Male may also bring prey to ledge, whence female takes it. Sometimes brooding begins with second or third egg of four, generally before completion of clutch. Period 28–29 days for each egg. *Fledging.*—At first all food provided by male, brooding female receiving food by pass and feeding young, but male occasionally feeds in absence of falcon. After about 2 weeks male brings food directly to nest and feeds young, and falcon also shares in work. Period 5 or 6 weeks, but young fed for some time by parents, which may drop food in air for young to catch. Single-brooded. *F.C.R.J.*

**Food.**—In Brit. Is. varies according to site of nest. Pigeons (domestic and wild) are always favourite food: on grouse-moors, Grouse freely taken and on coasts, sea-birds: while locally Rooks and Jackdaws form large proportion of food. Birds killed on the wing include: Carrion-Crow, Rooks and young, Jackdaws (many), Chough, Jay, Magpie, Starling (many), Hawfinch, Greenfinch, Chaffinch, Goldfinch, Sparrow, Corn-, Yellow and Snow-Buntings, Sky-Lark, Rock- and Meadow-Pipits, Pied and Grey Wagtails, Great Tit, Willow-Warbler, Fieldfare, Redwing, Mistle- and Song-Thrush, Blackbird, Ring-Ouzel, Wheatear, Stonechat, Whinchat, Hedge-Sparrow, Swallow, Sand-Martin, Kingfisher, Gt. Spotted Woodpecker, Cuckoo, Peregrine (♂), Merlin, Kestrel, Buzzard, Sparrow-Hawk, young Heron (from nest), wounded Barnacle-Goose, Brent, Sheld-Duck, Mallard, Teal, Wigeon; pigeons, Rock-, Stock- and Ring-Doves (many), Turtle-Dove, Storm-Petrel, Oyster-catcher, Dotterel, Ringed, Golden and Grey Plovers, Lapwing, Knot, Dunlin, Purple Sandpiper, Common Sandpiper, Redshank, Greenshank, Bar-tailed Godwit, Curlew, Whimbrel, Snipe, Woodcock, Common and Arctic Terns, Common, Lesser Black-backed and Herring-Gulls (also young of last), Kittiwakes (many), Guillemot, Razorbill, Puffin (many), Corncrake, Moorhen, Coot, Black and Red Grouse (last frequently), Ptarmigan, Pheasant and Partridge. That some birds are killed on the ground is shown by capture of domestic fowls and ducks. Mammals also taken, chiefly rabbits, also young hares, shrews, field-mice, and water-voles. Frogs, toad (once), and beetle remains found at eyrie (*Carabidæ* and dung-beetles). Seen to kill Raven (twice), Great Black-backed Gull, and to strike at Hen-Harrier. All above records are of British origin. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident and passage-migrant. In S. England as breeding-bird chiefly on S. and S.W. coasts, but a few inland; in Wales, N. England, Scotland (mainland and islands) and Ireland much more common and breeds both sea-cliffs and inland rocks. In autumn northerly-bred birds pass through Great Britain on migration (an adult ringed S. Sweden June reached Kent Jan. eighteen months later, and a young bird ringed Vesterålen, N. Norway, was caught in Berks Nov. following), while in winter our residents are frequently observed inland. *H.F.W.*

**Distribution Abroad.**—World-wide resident: Holarctic, Ethiopian, Oriental, Australasian, and Neotropical regions. Typical race breeds in Europe north to 71° in Norway, N. Sweden, Finland, but if *F. p. calidus* is recognized, N. Russian birds (Novaya Zemlya, Kolguev and Waigatz, and mainland) belong to this form. Some authors separate a mid-European form (*F. p.*

*germanicus*), but these races are not clearly defined and opinions vary. In the Mediterranean region a better-defined race (*F. p. brookei*) replaces it; but it extends to Portugal, N. Spain, France, N. Italy, Albania, Yugo-Slavia (Albania), Bulgaria, Romania, and central Russia. Beyond the range of *F. p. brookei* comes the N. African race (*F. p. pelegrinoides*), in the Canaries, N. Africa, possibly Cyprus: in central and S. Africa, *F. p. minor*, while *F. p. babylonicus* ranges from Persia to Turkestan and *F. p. calidus* to W. Siberia: in India and S.E. Asia, *F. p. peregrinator*, while other forms inhabit E. Asia, the Malay Archipelago, Australia, N. and S. America, etc. Some wander south: recorded accidentally Jan Mayen, Færoes, Azores, etc. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) whole crown, nape, and back of neck blackish slate-grey, sometimes quite black with a bluish tinge; bases of feathers of nape white or tinged buff occasionally showing slightly; upper mantle same, but feathers with blue-grey tips; lower mantle, scapulars, back, and upper tail-coverts pale blue-grey, feathers with blackish shafts and dark slate-grey bars; (*sides of head*) round eyes, ear-coverts, and broad moustachial stripe blackish as crown; between moustachial stripe and ear-coverts a small patch of greyish-white or buff finely streaked blackish; (*under-parts*) chin and throat white often tinged pinkish-buff; upper-breast same but often with deeper tinge of pinkish-buff, feathers with fine blackish shaft-streaks, often broadening to a drop-like shape and rarely with blackish spots; rest of under-parts somewhat darker and usually closely barred blackish, bars varying in width individually and sometimes reduced to spots down middle of breast, flanks greyer and more closely barred; axillaries and under wing-coverts even more prominently barred than flanks (amount of pink and strength of barring, some being very light, on *under-parts* varies considerably); *tail-feathers*, basal portions pale blue-grey (more whitish on inner webs except in central feathers) barred blackish, distal portions darker grey and with wider blackish bars, tips greyish-white; *primaries* blackish with very narrow whitish edging at tips and inner webs closely barred (tooth-like) with greyish-white, tinged buff near shaft; *primary-coverts* blackish with narrow whitish tips; *secondaries, greater* and *median coverts* as scapulars, but secondaries with tooth-like greyish-white bars along inner edges of inner webs; *lesser coverts* blackish with narrow grey edgings as upper mantle. This plumage is acquired by complete moult which appears to take place usually Aug.-Dec., but birds examined have been in various stages of moult in every month of year and moult is not only slow and gradual but varies greatly individually, *e.g.* in some moult is nearly complete in Oct., Nov., Dec. and Jan., while in others it is nearly complete in April, and in one about half-way through in May. There appears to be only one moult.

ADULT FEMALE.—Like male but (*upper-parts*) often rather darker on lower mantle and rump and whitish or buffish bases of feathers on nape more often showing and these feathers sometimes slightly edged buffish; (*under-parts*) upper-breast usually with larger drop-like blackish markings and rest of under-parts especially middle of breast and belly varying but usually more heavily barred than in male; tooth-like barring of inner webs of *primaries* usually more rufous-buff than in male.

NESTLING.—When first hatched not very thickly covered (round eyes and patch at sides of neck bare) with short creamy-white *down* (A) which is subsequently replaced by juvenile feathers, also some small, very short tufts of white *down* (B) amongst *down* (A). When nestling is about 10 days or a fortnight old it becomes very thickly covered with a coarse, long *down* (C), pale buffish-grey on upper-parts and pale creamy on under-parts. This *down* (C) replaces very short *down* (B) which can be seen clinging to its tips here and there, but it also grows in many parts where there is no previous down. *Down* (C) when fully grown almost conceals *down* (A). About same time or shortly after *down* (c) commences to grow, juvenile feathers begin to sprout and these entirely replace *down* (A), which adheres to tips of feathers. (*N.B.*—Downs which are subsequently replaced by true feathers growing from same follicle are termed "prepennæ.") *Down* (c) is shed when feathers are almost fully grown. In no case have I found it adhering to tips of under-down of feathered bird which is of a finer and more silky structure and appears to grow quite independently when nestling *down* (c) is mostly shed.

JUVENILE. MALE.—(*Upper-parts*) centre of crown, mantle, and back dark brown, feathers edged pale brown and whitish; fore-head and nape with dark brown much reduced and rest of feather creamy; scapulars as mantle but feathers with tooth-like pale brown marks along edges; upper tail-coverts barred dark brown and buffish-white; (*sides of head*) moustachial stripe dark brown, narrower than in adult and most of ear-coverts buffish-white with a few dark brown shaft-streaks; (*under-parts*) chin and throat buffish-white; rest of under-parts buffish-white to pale buff, each feather with broad mesial brown stripe, much broader at sides and on flanks and usually extending to broad bars on lower flanks; under tail-coverts with narrow widely spaced wavy brown bars; under wing-coverts broadly barred buffish-white and dark brown, axillaries with white often reduced to large spots; *tail-feathers* dark brown with a blue-grey tinge, barred buff, the bars being frequently incomplete, tips buffish-white; *primaries* as adult but with wider pale brown and white tips, outer webs at base usually with faint greyish marks, barring on inner webs more rufous-buff as in adult female; *secondaries* and *greater coverts* with small faint pale marks on outer webs and rufous-buff tooth-like bars on edges of inner webs; *median* and *lesser coverts* as mantle. FEMALE.—As male but scapulars sometimes with incomplete faint pale bars, throat usually with dark brown shaft-streaks, patch behind moustachial stripes with broader streaks and under-parts with broader stripes.

FIRST WINTER. MALE AND FEMALE.—Like juvenile. FIRST SUMMER.—The juvenile plumage is completely moulted from March to December of year following that in which bird was hatched, after moult birds become like adults, from which there is no means of differentiating them so far as I can discover. As in adult moult is gradual but period varies individually, some being half moulted in April and others only starting moult several months later and often not quite finished in December (*i.e.* when bird is 18 months old).

MEASUREMENTS AND STRUCTURE.—♂ wing 295–322 mm. (one 292), tail 130–158, tarsus 45–50, bill from cere 18–22 (15 British measured). ♀ wing 344–370, bill 22–26 (16 British measured). Primaries (1st vestigial one not included): 2nd longest, 1st 5–15 mm. shorter, 3rd 10–17 shorter, 4th 27–40 shorter, 5th 50–57 shorter; 1st very abruptly emarginated and attenuated near tip on inner web, 2nd slightly emarginated outer web. Outer secondaries shorter than 10th primary, inner ones becoming long and longest equalling 7th or 8th primary, tips somewhat pointed except innermost, which are rounded. Tail very slightly rounded, 12 feathers, tips slightly rounded. Rather less than half of tarsus feathered, toes long and strong, claws long, strong, compressed, curved, and sharply pointed. Bill short, thick and very strong, upper mandible curved with a prominent triangular projection on each cutting edge, proximal to tip, tip long and very sharp, under mandible broad and much shorter, with rounded tip proximal to which is a notch on each cutting edge. Nostrils large, round, and bare.

SOFT PARTS.—Bill slate-blue, dark at tip and yellowish at base, especially of lower mandible; cere and bare orbital spaces yellow tinged greenish (juv. bluish-grey); legs and feet bright yellow (juv. bluish-grey to greenish-yellow), claws blue-black; iris dark hazel; "inside mouth (juv. ♀ Nov.): palate pink in middle, bright slate-blue laterally with two yellowish patches near angle of mouth;

floor of mouth and tongue bright pink, underside of tongue broadly tipped slate-blue" (W. H. Dobie). *H.F.W.*

**Characters and allied forms.**—Peregrine Falcons are distinguished from other British falcons by their large size (but smaller than Gyr-Falcons, which have 2nd primary emarginated on inner web), strong black moustachial stripe and want of chestnut on thighs and belly. For differences of *F. p. anatum* see under that form. *F. p. germanicus* (Germany) has been separated as smaller (but measurements equal British birds) and as having stronger and narrower barring of under-parts of adults, but this is variable in British and it seems doubtfully separable. *F. p. brookei* (Mediterranean, etc.) is small, has rufous under-parts with close dark bars (*F. p. punicus* has been separated), *F. p. pelegrinoides* (=*F. barbarus*) (Canary Is., N. Africa) is slightly smaller than last, has rufous under-parts very lightly barred, rufous nape and rufous tinge on fore-head, *F. p. babylonicus* (Turkestan, Persia, N.W. India) has more rufous on crown and nape than last and less pronounced moustachial stripe, *F. p. calidus* (? *cæruleiceps* or *leucogenys*) (N. Russia) tends to have narrow moustachial stripe and large white patch behind it, but is not clearly differentiated from the typical form, *F. p. pealei* (N.W. America) has very wide, black bars on under-parts, and many other forms have been described. *H.F.W.*

*PLATE 61.*

## 260. THE NORTH AMERICAN PEREGRINE[1]—Falco peregrinus anatum Bp.

FALCO ANATUM Bonaparte, Geogr. & Comp. List, p. 4 (1838—New Jersey).
*Falco peregrinus*, E. Bidwell, Bull. B.O.C., xxvii, p. 103 ; *cf.* Brit. B., v, p. 219.
*Falco peregrinus anatum* Bp., Pract. Handb., ii, p. 111.

**Habitat.**—Much as Peregrine. *B.W.T.*

**Field-characters and General Habits.**—Adults not separable from Peregrine, but very dark immature plumage perhaps distinguishable in field, see "Description."

Habits as Peregrine ; often perches on trees. *B.W.T.*

**Voice.**—Does not appear to differ from Peregrine. *B.W.T.*

**Display and Posturing.**—See under typical race.

**Breeding.**—Breeds on ledges, in cavities and pot-holes in cliffs, and in sandstone or clay bluffs, also occasionally in cavities caused by decay or breaking off of part of trunk of tree ; once in an old eagle's nest. Also on ground on top of cliff and on small islands. No actual nest, eggs being laid in a hollow scratched out by bird. *Eggs.*—3 or 4, occasionally 5, rarely 6, and 7 once recorded (L. R. Wolfe). In shape and colouring like European Peregrine : ground creamy-white but often completely or almost covered with blotches or wash of mahogany-red, less often brick-red or tawny. Some eggs, however, show a good deal of the ground-colour. Average of 61 eggs (C. Bendire and A. C. Bent), 52×41. Max. : 57×43 and 56·5×43·5. Min. : 48·5×38·5 mm. An egg in A. W. Johnson's collection measured 60·5×45·3 mm. *Breeding-season.*—From early March in California and late

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[1] Called Duck Hawk in *A.O.U. Check-List.*

March in eastern States to June and even early July from Alaska to Ungava, varying according to latitude. *Incubation.*—Eggs laid at intervals of 2 or more days. Incubation said to begin on completion of set, but great differences in size of young indicate earlier brooding: chiefly by female, but male takes small share. Period estimated at 33 to 35 days (J. A. Hagar) but probably rather less, judging from observations on other races. *Fledging.*—Female broods in early stages, but occasionally leaves to feed, while male brings food throughout period, both working in later stage. Period 33–35 days (Hagar), about 6 weeks (J. Dixon). Single-brooded. (See A. C. Bent, *Life Histories N. American Birds of Prey*, Pt. 2, pp. 43–67.) *F.C.R.J.*

**Food.**—Mainly birds taken on the wing: chiefly pigeons, flickers, jays, meadowlarks, etc. in inland localities and smaller sea-birds on coast (for details see A. C. Bent, *Life Histories N. American Birds of Prey*, Pt. 2, pp. 53–58). Among the groups represented in this long list are: domestic poultry, grebes, auklets, murrelets, small gulls, wild ducks, shearwaters, small herons, coots, gallinules, rails, woodcock, snipe, sandpipers, plovers, quail, grouse, ptarmigan, pheasant, sparrow-hawks, cuckoos, kingfishers, doves, flickers, marsh-hawks, nighthawks, etc., swifts, and some 25 groups of passerine birds from crows to warblers and chickadees. Occasionally mammals (hares, rabbits, woodchucks, squirrels, and field-mice): also Coleoptera and Odonata. (American vernacular names are used here as in authority quoted.) *F.C.R.J.*

**Distribution.**—*England.*—Two. One (young) shot Newbold Verdon near Market Bosworth (Leicester), Oct. 31, 1891 (*ut supra*). One (young) netted Humberstone (Lincs), Sept. 28, 1910 (G. H. Caton-Haigh, *Brit. B.*, v, p. 219). *H.F.W.*

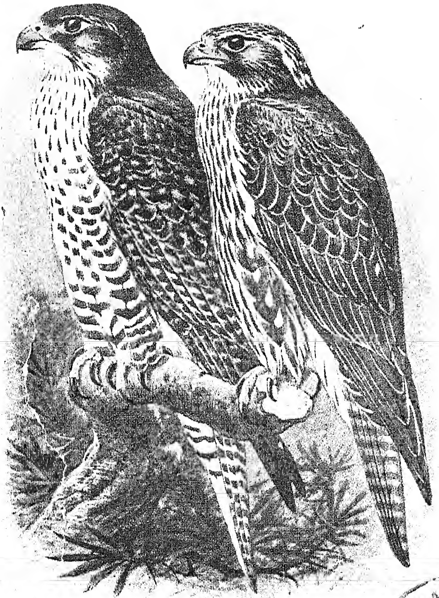
**Distribution Abroad.**—Breeds in N. America from Alaska, N. Mackenzie, Boothia Peninsula, Baffin Is., and central Greenland south to Lower California, central Mexico, Arizona, Texas, Kansas, Missouri, Indiana, Pennsylvania, Connecticut, and mountains of Tennessee. Winters south from Vancouver Is. to W. Indies and Panama. Accidental in S. America. Replaced in Aleutian and Commander Is. by *F. p. pealei.* *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE.—Very much like *F. p. peregrinus* and often difficult to distinguish but moustachial stripe usually wider and often joined to ear-coverts and sometimes patch between moustache and ear-coverts is grey; under-parts sometimes very finely peppered grey but this is also sometimes so in *F. p. peregrinus.*

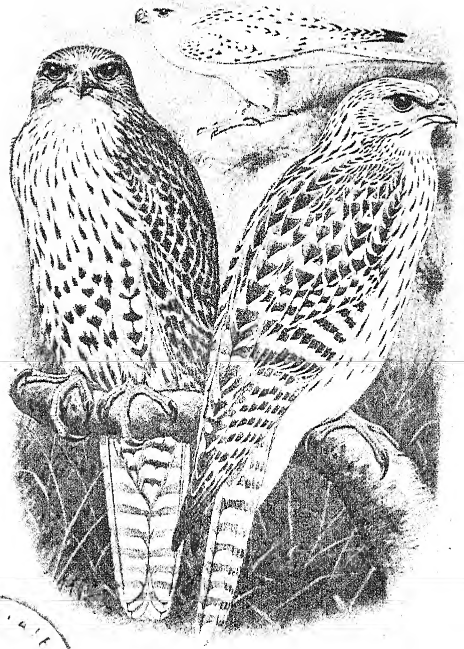
JUVENILE.—Very distinct from *F. p. peregrinus*, *upper-parts* being very dark —usually blackish-brown, edged dark rufous-brown; streaks on *under-parts* black-brown much darker than in *F. p. peregrinus*, ground-colour of under-parts more rufous-buff and not so pale as in juvenile *F. p. peregrinus.*

MEASUREMENTS AND STRUCTURE.—♂ wing 300–330 mm., tail 138–163, tarsus 44–50, bill from cere 18–21·5 (12 measured). ♀ wing 345–370, bill 22–24·5. Structure as in *F. p. peregrinus.* *H.F.W.*

[NOTE.—A Lanner Falcon (stated to be *Falco feldeggii*) was picked up dead near Carnforth, Lancs, on April 26, 1902, having been observed in the neighbourhood some weeks (H. W. Robinson, *Field*, Jan. 30, 1904, and elsewhere). This species inhabits the Mediterranean region, the Nile Valley, and central and S. Africa. The S. European form (*F. biarmicus feldeggii*) breeds in the Italian and Balkan peninsulas. The Algerian form is used for falconry in N. Africa and might be imported to this country, but the specimen in question was apparently not critically examined.]

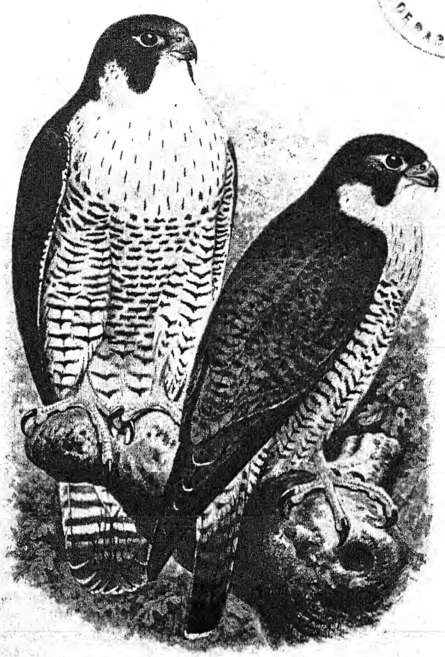


*Ad. f.* *Juv. m.*
GYR-FALCON (*ca* ⅙)

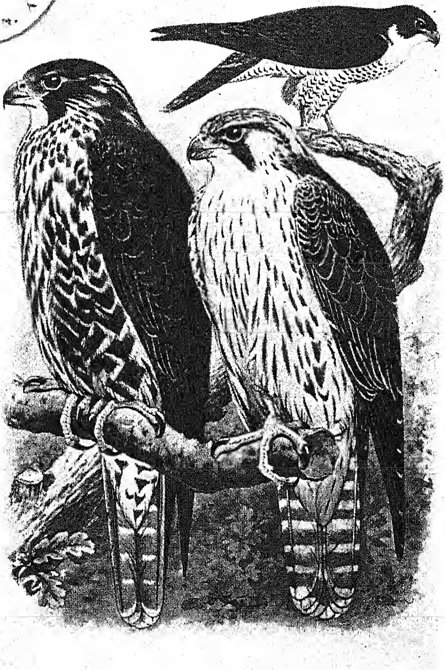


Iceland *Ad. f.* Greenland *Ad. f.* (*upper*) *Juv. m.* (*lower*)
ICELAND FALCON (*ca.* ⅙) GREENLAND FALCON

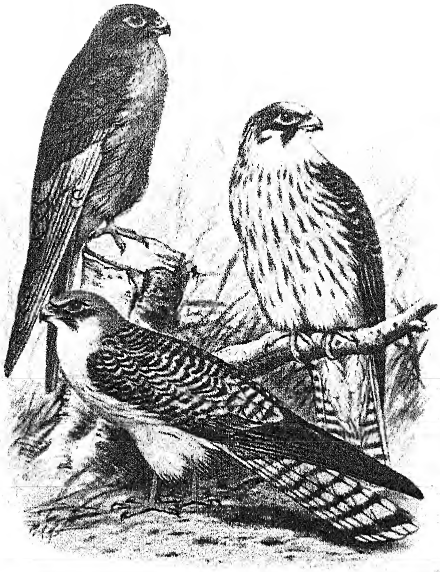
ASAFIYAH STATE LIBRARY HYDERABAD DN.



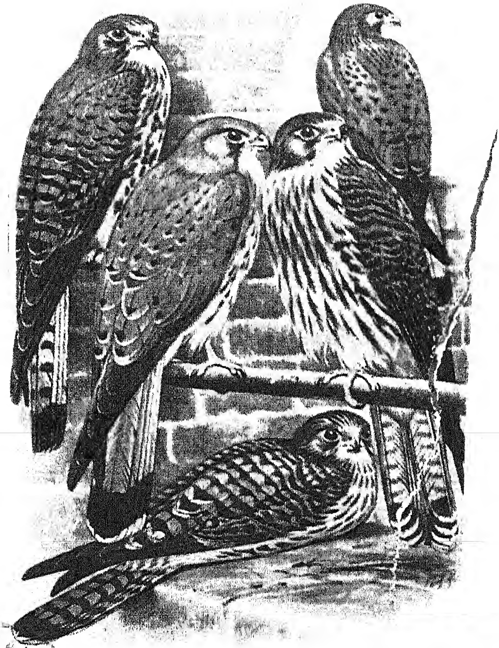
*Ad. f.* *Ad. m.*
PEREGRINE FALCON (*ca.* ⅕)



*Juv. f.* *Juv. m.* N. American *Ad. f.* (*upper*)
PEREGRINE FALCON (*ca.* ⅕)



*Ad. m.* *Ad. f.* *Juv. m.*
RED-FOOTED FALCON (*ca.* ⅕)



*1st summer m.* *Ad. m.* *Juv.* *Ad. f.* *2nd summer m.*
KESTREL (*ca.* ⅕)

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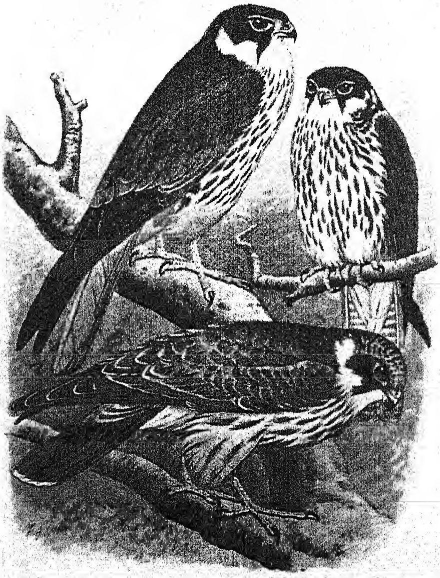
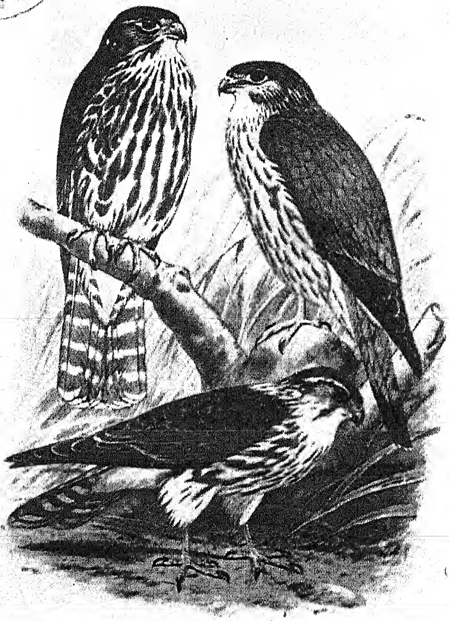


*Ad. m.* *Juv.* *Ad. f.*
HOBBY (*ca.* ⅕)



*Ad. f.* *Juv.* *Ad. m.*
MERLIN (*ca.* ⅕)

*PLATES 62 and 71.*

## 261. THE HOBBY—Falco subbuteo subbuteo L.

Falco Subbuteo Linnæus, Syst. Nat., ed. x, i, p. 89 (1758—Europe. Restricted typical locality: Sweden).
*Falco subbuteo* Linnæus, Yarrell, i, p. 65; Saunders, p. 349.
*Falco subbuteo subbuteo* L., Pract. Handb., ii, p. 113.

**Habitat.**—In breeding-season in Britain frequents downlands, heaths, and undulating country with scattered clumps and belts of trees, especially pines, outskirts or open parts of woodland, and agricultural country well supplied with hedgerow timber. On Continent in variety of suitably timbered, but not heavily wooded, country, from districts where woods alternate with open ground to steppe and other open country with only a few trees. In winter-quarters most frequently in bush country and cultivated lands, seldom in forest areas (V. G. L. van Someren). *B.W.T.*

**Field-characters and General Habits.**—Hobby is most graceful and agile of British falcons: size approximately as Kestrel, but with *long, scythe-like wings, comparatively short tail and Peregrine-like flight*, a rapid winnowing alternating with glides on extended wings. At medium to close range or at rest *dark, slaty upper-parts, broad black moustachial stripe, white under-parts with conspicuous black streaks, and rusty red thighs and under tail-coverts* are characteristic. Young are browner above, but very dark (light edgings to feathers in juvenile), with under-parts more buff and more heavily streaked, and without red on thighs and under tail. Length *c.* 12–14 ins.; female generally larger than male. Female's wings usually look markedly broader in field than male's and blunter at tip (H. Lynes, W. H. Thompson); her wing-beat is also much stronger and firmer than male's, latter's wing appearing very flexible along its whole length, which gives its wing-beat a characteristic "flip" (Thompson).

Displays marvellous mastery and speed of flight; capable of capturing even such rapid fliers as Swifts on the wing. In hunting birds it employs on occasions all the tactics of Peregrine, *viz.* the stoop, pursuit and capture without stoop, or seizure from below, but will also dash straight through a flock of hirundines, seizing one in passing without any abatement of speed (J. W.-Bond) and, unlike Peregrine, feeds very largely on flying insects. Steep descent and swerving pursuit after dragon-fly is performance of extra-ordinary grace, but less agile insects such as beetles are hawked in a more leisurely manner. Insects are seized with claws and held to beak while eaten, and W.-Bond states that even birds if small enough may be eaten in the air in this manner. As a rule, however, they are plucked on a branch or on ground in open. Hunts chiefly over open country, frequently where there are scattered trees and copses, but keeping clear of closed woodland. Sometimes hovers for a few seconds. For aerial evolutions see under "Display." Ordinarily perches in trees, but at times also within foot or two of ground amongst heather, etc. Often remains active till well after twilight. Roosts in trees; tends on arrival to do so near intended nest-site, but afterwards often farther away (Thompson). Usually seen in pairs or singly, but sometimes several together. Pellets, usually consisting largely of insect remains, very like those of Kestrel (L. Tinbergen). *B.W.T.*

**Voice.**—Notes are: (1) A clear repeated "kew-kew-kew-kew-kew" or

" wer-wer-wee-wee-wee," very variable both in form and timbre ; " kew " may be repeated many times or exceptionally uttered singly. Sometimes first notes are slurred and timbre is rather petulant, and often final notes are somewhat higher-pitched and uttered more quickly than the introductory ones. Variations of this call can sound very like those of Wryneck or Kestrel, but at all times characteristic Hobby timbre makes any variant quite diagnostic. (2) High-pitched incisive " keek," usually uttered singly, more rarely in succession. (3) Sibilant " whits-yo͞o," uttered when birds are very excited, rarely near nest, but frequently high up in air (W. H. Thompson). Often very noisy near nest, and sometimes quite noisy when alone at other times of year. See also D. N.-Thompson, *Brit. B.*, xxv, p. 144. *B.W.T.*

**Display and Posturing.**—" Long soaring flights (also seen at other times of year), in which a pair circle up and up often to a very considerable height, are one of the most marked features of the breeding-season. In course of these male frequently stoops at female, particularly in period of *c.* 3–4 weeks before eggs are laid. A food-presentation ceremony is regular in weeks preceding laying. In simplest form sequence is as follows : male flies in calling ' wer-wer-wee-wee-wee ' (usually starting to call while still far off), swings in to some bare horizontal branch, shifts prey from claws to bill and ' keeks ' several times. Female then flies to branch, birds turn to face one another and walk towards each other with heads down, bodies stiff and horizontal, and standing very high on their legs, so that chestnut feathers are displayed. When heads are almost touching they stop in same pose. If female is impatient for food she now takes it from male and flies to another tree to eat it. At other times they may continue standing in this remarkable pose, strikingly different from their ordinary upright one, for several minutes, calling softly ' wer-wer-wer ' all the time until female finally takes food and goes off. When this display first develops there is no further relevant behaviour on part of male, but when excitement reaches its highest peak, he often concludes performance by flying in circles and figures of eight round tree in which female is eating the prey. At all times Hobby is a playful species and may be seen performing in most spectacular manner, singly, in pairs, or several together. Stooping at one another, looping the loop, tumbling in an entirely unco-ordinated manner, accelerating quickly and then turning over on back and gliding upside down, and every other form of ' stunting ' and wild chases may be observed. But most remarkable exhibitions are seen when male catches a bird, ascends to great height and then dives straight down on female at full speed, throwing himself up to ' pass ' to her at full speed (this is of course only special development of ordinary ' pass,' which is not uncommon). Aerial evolutions are not confined to breeding-season and are not stereotyped, there being no set sequence, and different pairs or same pair at different times perform differently, but they are obviously commonest and most intense under influence of sexual excitement " (W. H. Thompson). D. N.-Thompson has observed female on edge of old nest raising wings and tail so as to show chestnut feathers, when male flew into tree, hovered over her, and lighted on her back with raised and trembling wings. Similar displays were observed on trees in nesting wood, as well as attempt at aerial coition, male hovering over female and momentarily alighting on her in mid-air. *F.C.R.J. & B.W.T.*

**Breeding.**—Like other falcons, does not build a nest, and is dependent on the provision of nests by other species. Usually takes possession of unoccupied nest of Carrion-Crow, but occasionally will use those of Rook, Magpie, Jay, Sparrow-Hawk, Heron, Wood-Pigeon, or squirrel. Sites naturally vary a good deal: in southern counties most are in pines, but in midlands commonly in deciduous trees. New nests are generally flattened out and in some cases part of lining removed. *Eggs.*—Normally 3, sometimes 2 only, while 4 have occasionally been recorded. Shape blunt ovate: stippled all over with small spots of red-brown when fresh, rapidly fading to yellowish-brown; a few eggs have ground completely covered with rather light red-brown and a rare variety has rich red-brown markings with pure white ground. In a series, much paler than Merlin's or Kestrel's and markings finely stippled. Average of 100 British eggs, 41·57×32·73. Max.: 45·5×31·8 and 44·1×35·7. Min.: 38×31·4 and 41·1×31 mm. *Breeding-season.*—Most birds have full sets about 2nd week of June, but others do not lay till late in June and occasionally a pair has laid at end of May. *Incubation.*—The eggs are laid at 2–3 days interval: often the shorter period between 1st and 2nd and the longer between 2nd and 3rd. Incubation begins with second egg (D. N.-Thompson), perhaps also at times with first: carried out chiefly by female, though male certainly takes part. Period 28 days. During this period male feeds hen both by food pass and by calling hen off to adjoining perch (N.-Thompson). *Fledging.*—In early stages female broods: male provides food and hen meets him in air and takes the pass to feed young, or male may bring prey to nest or perch. Insect-feeding pairs bring food at more frequent intervals and both sexes share in work, differing from those taking birds, but in later stages female also provides food in all cases. Period 28–32 days (N.-Thompson, K. Morris), but young also fed after fledging, in air. Single-brooded. *F.C.R.J.*

**Food.**—In S. England small birds are freely taken: species varying according to locality. Sky-Lark is staple food in some districts, in others Swallows and Martins (chiefly House-): Meadow-Pipit frequently recorded: but also Starling, Greenfinch, Linnet, Twite, House-Sparrow, Yellow Bunting, Wood-Lark, Tree-Pipit, Great and Blue Tit, Chiffchaff, Willow-Warbler, Song-Thrush, and Blackbird. Swifts not infrequently taken on wing: Turtle-Dove pursued: once pigeon and Partridge. Insects also form considerable portion of food as shown by stomach contents, especially in late summer, largely Orthoptera (grasshoppers, etc.), Odonata (with wings cut off), Lepidoptera (*Triphæna pronuba*, *Hepialus humuli*, etc.), Coleoptera (*Geotrupes*, *Melolontha* and *Curculionidæ*). Bats have been recorded several times, and on Continent field-mice and shrews, which also have been taken from Kestrel: birds recorded include Hawfinch, Pied Flycatcher, Great Grey Shrike, Wheatear, young Hoopoe, Great Spotted Woodpecker, etc., and insects include Plecoptera (*Perlidæ*), Hemiptera and Hymenoptera (*Formicidæ*). In winter-quarters Orthoptera (*Acridiidæ*) and Isoptera (swarming white ants). *F.C.R.J.*

**Distribution.**—*England.*—Summer-resident; end 3rd week April (early dates Feb., 1894, Yorks; Mar. 3, 1866 (W. E. Clarke); 20, 1858, and 25, 1863, Norfolk; Ap. 9, 1936, Berks) to Sept., occasionally Oct. and even Nov. Evidence of southward passage E. coast England Oct. Breeds regularly in counties south of Thames and as far west as Devon (very rarely Somerset, rare migrant Cornwall), and fairly regularly in Oxon, Hereford, Worcester, Salop, Northants, and Gloucester; less regularly in other counties on north side of Thames and in Beds, Cambs, Suffolk, Norfolk, and Lincs; has bred occasionally or exceptionally in Warwick, Staffs, Leicester, Rutland, Derby, Cheshire, and Yorks. Farther north vagrant, but pairs 1930, 1935 and 1937, Cumberland. *Wales.*—Has bred Glamorgan and Brecon, and possibly Monmouth; otherwise a rare vagrant. *Scotland.*—Rare vagrant. Once bred (Perth, 1887). Has occurred in most parts even as far north as Shetlands and Fair Is., but not in Orkneys, Inner or Outer Hebrides. *Ireland.*—Has occurred thirteen times or more, chiefly in south-east. Two nestlings ringed Wilts reached S.W. France in Oct. of same year and Hereford in Aug. of following year. *H.F.W. & N.F.T.*

**Distribution Abroad.**—Summer-resident in Palæarctic region, except extreme north. Typical race breeds in Europe to 61½° in Norway (rare): 67° in Sweden, 65° in Finland and N. Russia to Archangel, and 65° east to Urals (recorded to 67° on R. Petchora). In south to Spain (Andalucia), S. France, probably Corsica, Italy, Balkan peninsula, Crimea, and Caucasus. Also Asia Minor, Cyprus, Palestine, Persia, W. Siberia and Turkestan to Altai, Tarbagatai, and Semipalatinsk. Replaced by allied races in N.W. Africa (*F. s. jugurtha*), also in E. Asia to Kamtschatka, S. Kuriles and Sakhalin (*F. s. jakutensis*), and in China (*F. s. streichi*): while Australian, African, and S. American forms are regarded by some writers as conspecific. Winter-quarters of typical race in Africa: perhaps also N.W. India: E. Asiatic birds to China. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. SUMMER AND WINTER.—(*Upper-parts*) bases of feathers on fore-head and narrow line over eye buffish-white; crown dark slatish-brown to blackish-brown, feathers very narrowly edged greyish to rufous-buff; nuchal band white, feathers with subterminal rufous-buff marks and dark brown tips, latter often interrupting band especially on sides of nape; rest of upper-parts dark brownish-slate, feathers with fine black shaft-streaks; bases of outer upper tail-coverts and usually of longer scapulars with concealed buff bars (*N.B.*: when worn, plumage of upper-parts becomes dark brown with little or no slate); (*sides of head*) under eye, upper part of ear-coverts and well-marked moustachial stripe brown-black; (*under-parts*) rest of sides of neck, chin and throat white, often tinged buff, especially when freshly moulted; breast, flanks, and upper part of belly white to buff and sometimes rather rufous-buff, broadly and thickly streaked black-brown; tibia, lower belly, vent, and under tail-coverts rust-red, sometimes uniform but usually with some blackish streaks, especially on tibia (females generally have more and thicker streaks on tibia and under tail-coverts than males); under wing-coverts and axillaries creamy-white to buff with dark brown streaks and bars; *tail-feathers*: central pair brownish-slate, outer webs of rest same but tips with a spot of buff and inner webs narrowly barred buff to rufous; *primaries* and *secondaries* black-brown (strongly tinged slate when freshly moulted), inner webs except at tip with close tooth-like bars of buff to rufous; *wing-coverts* as mantle. This plumage is acquired by a complete moult which is very gradual, commencing with body-feathers in July and Aug., becoming more active in Sept. or Oct. when wing-feathers commence to moult and usually not complete until March or even April.

NESTLING.—*Down* (A) fairly long and plentiful covering whole body except round eyes and small bare patch at base of sides of neck; upper-parts very pale creamy-buff, under-parts nearly white. Only very young nestling in down examined, but judging by partly feathered birds a longer and coarser nestling *down* (C) of greyish colour grows as in Peregrine (see pp. 13–14).

JUVENILE.—Like adults but *upper-parts* and *wing-coverts* much darker, very dark brown or brownish-black, each feather with narrow edging of pale buff to rufous-buff, scapulars with more prominent buff bars than in adult; streaks on *under-parts* wider and blacker than in adult; tibia, vent, and under tail-coverts buff to rufous-buff not rust-red; *tail-feathers* as adult but less slate, central pair as well as rest with longer buff tips, rufous bars encroaching on outer webs; *wing-feathers* and *primary-coverts* darker than adult and with pale buff tips.

FIRST WINTER.—Like juvenile but pale edgings to feathers of *upper-parts* gradually become worn off. FIRST SUMMER.—The juvenile body-plumage frequently commences to moult in April and sometimes in March (*i.e.* when bird is nearly a year old), but birds in May have often not begun and birds are not infrequently in full moult in August and later, *i.e.* when a year or more old. When this moult is complete bird is indistinguishable from adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 247 (one 240)–272 mm., tail 130 (one 122)–140, tarsus 34–37, bill from cere 12·5 (one 11·5)–14 (12 measured). ♀ wing 265–280. Primaries (1st vestigial one not included): 2nd longest, 1st 6–15 mm. shorter, 3rd 12–16 shorter, 4th 30–38 shorter, 5th 48–60 shorter; 2nd emarginated outer web and 1st very abruptly emarginated and attenuated near tip of inner web. Rest of structure as in Peregrine.

SOFT PARTS.—Bill leaden-blue, tip bluish-black; cere, gape, and bare skin round eye and legs and feet bright yellow (juv. cere and round eye pale lead-blue or greenish, legs and feet paler yellow); iris dark brown. *H.F.W.*

**Characters and allied forms.**—Hobby is distinguished from other British falcons by moustachial stripe, rufous vent, nuchal band, thickly streaked under-parts and wing-formula. *F. s. jugurtha* (N.W. Africa) is slightly paler on upper-parts, *F. s. jakutensis* (E. Siberia) is rather darker than typical form on upper-parts and streaks on under-parts are dark, *F. s. streichi* (China) is like typical form but smaller. None of these races is very clearly separable and others have been described. *H.F.W.*

*PLATES 62, 63, and 66.*

## 262. THE MERLIN—Falco columbarius æsalon Tunstall

FALCO ÆSALON Tunstall, Orn. Brit., p. 1 (1771—France).
*Falco regulus* Pallas, Hand-List Brit. B., 1912, p. 112.
*Falco æsalon* Gmelin, Yarrell, i, p. 74; *F. æsalon* Tunstall, Saunders, p. 351.
*Falco columbarius æsalon* Tunstall, Pract. Handb., ii, p. 115.

**Habitat.**—In breeding-season, frequents moors, fells, and hill country, bogs, heathy brows above sea-cliffs, and coastal sand-dunes. At other times resorts also to marshes, low-lying coasts, and open country generally. *B.W.T.*

**Field-characters and General Habits.**—Small size of male (not much larger than Mistle-Thrush) alone precludes confusion with other falcons, though *flight* (see below) and colouring are also characteristic. *Upper-parts slate-blue, nape and under-parts warm, often rufous, buff, latter with dark streaks*; tail with broad black band, no moustachial stripe. Larger female might be confused with hen Kestrel, but more compact-looking, with *shorter tail, upper-parts dark brown, not reddish-brown, and brown-streaked under-parts whitish*, instead of pinkish-buff. Flight is also quite different, buoyant, impetuous and dashing, with quick, winnowing wing-beats and occasional intervals of gliding, often with noticeable dips and swerves, and commonly close to ground, though also at times well up when not hunting. Apart from colour differences, less narrow and pointed wings distinguish from Hobby. Young resemble female. Length *c.* 10½–13 ins.; female larger than male.

Perches on rocks or boulders, walls, fences, etc., and on eminences or bare patches on ground, and such sites near nest are used as plucking-places. Will also perch on trees and, at least in winter, frequently roosts in plantations, though stated to prefer young or stunted trees and also roosting regularly on or near ground. In hunting it flies low, capturing birds by swift pursuit, rising above them in order to strike, but seldom if ever making long stoop. Prey is also occasionally taken from ground, and moths or other insects occasionally hawked. Sometimes hovers. Bold and aggressive in defence of territory, attacking birds even as large as eagle. *B.W.T.*

**Voice.**—Usual cry when nesting-ground invaded is rapid, shrill, grating chatter " quik-ik-ik-ik - - - " (male) or rather lower-pitched " quek-ek-ek-ek - - - " (female). W. Rowan found call of male bringing in food was slightly different variant of this, but call of female for food quite distinct, a drawn-out, repeated " eep-eep-epp." G. C. S. Ingram and H. M. Salmon, however, describe food-call of male as penetrating " quee-eep." Male has also a thin chirruping " chic " repeated several times, not very quickly (J. W.-Bond), and both sexes use soft " tick " on landing at nest (Rowan). Whimpering of young is like female's " eep-eep," but very soft and uttered at much quicker rate (Rowan). *B.W.T.*

**Display and Posturing.**—Male appears to precede female on migration and prior to pairing makes continuously short and distinctive flights from one perching-post to another, calling frequently (D. N.-Thompson). But T. A. Coward and C. Oldham give very similar description of male flying from mound close to nest, keeping low for *c.* 20 yds., then soaring upwards, but to no great height, hovering for a few seconds, and returning to mound, repeating this several times, so that evidently this behaviour is not entirely confined to pre-mating period. During breeding-season both sexes circle high over nesting-site, but no regular aerial display has been recorded. Feeding of female by male at nesting-site has probably a ceremonial character, as in case of Hobby, and is frequently followed by coition (W. Rowan). *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds on moors and rough mountain pastures in N. England and Scotland: in Wales also on sea-cliffs and among sand-dunes. *Nest.*—Generally eggs are laid on ground in a scratching among heather or with apology for a nest in shape of a few heather stalks, bits of moss, and lining of bents. In cliffs and when found breeding in trees old nests of Carrion or Hooded Crow (occasionally Raven) are usually annexed; in dunes a fairly neat nest is made of bents and marram grass in a hollow in the sand. *Eggs.*—Usually 4 or less commonly 5, 6 exceptional, and 3 sometimes in first layings: 7 only recorded from Continent: laid at intervals of at least 2 days. Normally thickly and evenly stippled with purplish-brown, ranging from chocolate to red-brown: exceptionally showing much light ground and only pale markings, or boldly marked with rich red, like Kestrel's eggs. Average of 100 British eggs, 39·95×31·28. Max.: 42·4×32 and 41·4×33·8. Min.: 37×29·1 and 40·3×29 mm. *Breeding-season.*—Begins early in May and most birds have laid by last week of that month: exceptionally early in June. *Incubation.*—Sometimes begins before completion of clutch: by both sexes, but larger share by female. Period 28 to 32 days. *Fledging.*—

Male alone provides food till late stage, and female leaves nest to take it from plucking-place, occasionally by pass; food brought in feet, and distributed among young. E. R. Paton has recorded male feeding young. Period 25–27 days (R. H. Brown). Single-brooded. *F.C.R.J.*

**Food.**—Small birds, occasionally insects and small mammals. Nearly all observers note absence of game-birds, but chicks of Red Grouse have been recorded on a few occasions. Also young Partridge and Woodcock (once). Normal food in summer Meadow-Pipit, also Sky-Lark, Linnet, Twite, Yellow Bunting, Ring-Ouzel, and Song-Thrush. Less frequently Starling, Hawfinch, Greenfinch, Goldfinch, Chaffinch, Corn-, Reed-, and Snow-Buntings, House-Sparrow, Rock-Pipit, Pied Wagtail, Blue Tit, Spotted Flycatcher, Goldcrest, Willow-Warbler, Mistle-Thrush, Fieldfare, Redwing, Blackbird, Stonechat, Whinchat, Wheatear, Wren, Dipper, Swallow, Sand-Martin, and Cuckoo. There are also definite records of occasional captures of larger birds such as Golden Plover, young and incubating Lapwing, Ringed Plover, Dunlin, Sanderling, Turnstone, Sandpiper, Redshank, Snipe, Rock-Dove, and Little Tern. Field-mice, voles, and shrews have occasionally been recorded: also lizards and insects, including Odonata, Lepidoptera (*Saturnia carpini*, sometimes in numbers, *Lasiocampa rubi*, *L. quercus*), and Coleoptera (*Cicindela*, *Ocypus olens*, dung-beetles, etc.). Seen to attack Hooded Crow, and has been known to take young rabbits. *F.C.R.J.*

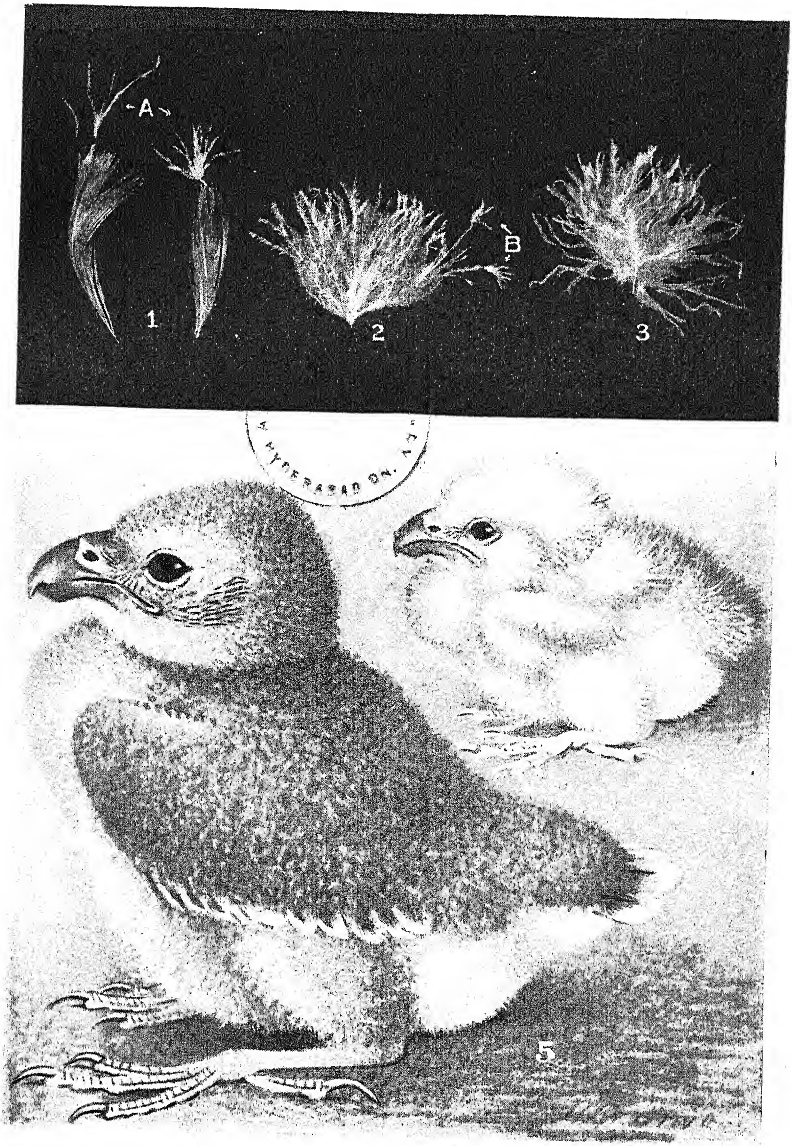
**Distribution.**—*British Isles.*—Resident and winter-visitor. Breeds in many parts of Wales, Pennine Range and spurs, moors of N.E. Yorks, Cheviots, and throughout Scotland and Ireland in suitable localities. A few pairs also breed Exmoor and Dartmoor. To breeding areas on higher ground Merlins are summer residents, movements of dispersal take place autumn, so that by early winter becomes fairly generally distributed, especially affecting coastal marshes and other low ground. Twenty-five recoveries of British ringed nestlings indicate movements of comparatively short distances only. Numbers augmented in autumn by Continental migrants arriving northern and western isles Scotland and E. coast Scotland and England mid-Aug. to mid-Nov. (chiefly Sept. and Oct.), some passing south along E. coast. Four nestlings ringed Iceland reached Scotland, Oct., and Lancs, Nov., and Ireland, Dec. of same year, and Scotland, April three years later. One ringed Sweden recovered Jersey, Jan. two years later. Return passage spring (early April to end May) not so well marked, chiefly observed northern isles. *H.F.W. & N.F.T.*

**Distribution Abroad.**—A Holarctic species. European race breeds in Iceland and Færoes (separated by some authors), Norway to 71°, Sweden, Finland, Russia east to R. Mezen and south to Minsk, south to Baltic, Öland, Gothland and Baltic states. Said to breed Czecho-Slovakia (Riesengebirge). Replaced by allied forms in N.E. Russia, Novaya Zemlya, and W. Siberia (*F. c. regulus*), E. Siberia (*F. c. insignis*) as well as from the Kirghiz Steppes and Altai district, while the typical race inhabits N. America. European race winters south to Mediterranean and N. African coast. Casual in E. Greenland and off Bear Is., also once Natal. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER.—(*Upper-parts*) bases of feathers of fore-head and line over eyes greyish-white finely streaked black; rest of fore-head and crown dark slate, usually tinged buffish on fore-part, finely streaked black; broad nuchal band, extending up sides of head in a narrow line to back of eye, rufous, each feather with thick black streaks at tip, bases white; rest of upper-parts slate-blue, palest on rump and upper tail-coverts, darkest on upper mantle, each feather with narrow black mesial streak, basal part of inner webs of outer scapulars greyer and often barred brown; (*sides of head*) lores greyish-white, tipped black forming a black line in front of eye; cheeks and ear-coverts greyish-white, marked rufous and streaked brown-black, tips of ear-coverts darker with slatish tinge; (*under-parts*) chin and throat buffish- or greyish-white, often unstreaked but sometimes with some very fine streaks on throat; rest of under-parts pinkish-rufous (varying in shade individually but always deeper when freshly moulted and becoming whitish in worn plumage), each feather with mesial black-brown streak, usually fine but sometimes drop-shaped and usually forming large spots on flanks; middle of belly, tibia, and under tail-coverts with very fine streaks; axillaries and under wing-coverts barred rufous-brown and white with dark shafts, upper series of feathers buff streaked black-brown; *tail-feathers*, distal portion forming broad band black, tips greyish-white, basal three-quarters slate-blue with some incomplete black bars which are sometimes absent, especially on central tail-feathers, and rarely complete, inner webs of all except central tail-feathers more ashy with fine dark freckling and usually strongly barred black but exceptionally with only incomplete bars; *primaries* grey-black with ashy-grey tips more conspicuous on inner feathers, outer webs tinged grey often in form of incomplete bars, outer web of 1st primary usually with whitish serrated edging, inner webs closely barred ashy-grey to white; *secondaries* with black shafts and slate-blue outer webs (ashy at tips) and less whitish and less well-defined bars on inner webs, innermost secondaries without bars; *primary-coverts* like secondaries but not quite so slate; *wing-coverts* as mantle but upper series of *lesser coverts* often tinged buff. This plumage is acquired by complete moult, wing-feathers commencing in June and moult complete usually in Nov. but sometimes not until Dec. and exceptionally just finishing in Jan. SUMMER.—What certainly appears to be a second moult confined to body-feathers takes place Feb.-March and occasionally not finishing until April. Coloration as in winter.

ADULT FEMALE. WINTER.—(*Upper-parts*) bases of feathers of fore-head and line over eye creamy-white; rest of fore-head and crown dark brown more or less washed rufous-brown and streaked black; nuchal band as male but usually whiter or not so rufous; mantle and scapulars dark brown, feathers slightly tipped rufous and with rufous spots or incomplete bars, and fine dark shaft-lines, often a grey tinge on mantle and scapulars; back and rump greyer and sometimes slate-grey with dark shaft-lines and often less rufous spots or bars; upper tail-coverts paler, tipped whitish and with whitish bars; (*sides of head*) cheeks and ear-coverts white to buffish-white streaked brown with a blackish line in front of eye and an indication of narrow dark brown moustachial stripe; (*under-parts*) chin and throat white to creamy-white, sometimes with a few fine brown streaks; rest of under-parts same but with wide rufous-brown streaks and black shaft-lines, feathers of flanks with irregular broad bars of brown, middle of belly, tibia, and under tail-coverts with few and fine streaks; under wing-coverts and axillaries as male but usually with less white and more rufous-brown; *tail-feathers* dark brown tipped creamy-white and barred buffish-white to rufous-buff, barring on central pair being usually less buff and sometimes dull ashy-grey; *primaries*, *secondaries*, and *primary-coverts* dark brown tipped buffish-white, outer webs with rufous to pale buff spots and inner webs closely barred rufous, becoming paler on inner edge; *wing-coverts* as scapulars and mantle. Moult as male. SUMMER.—Body-moult as in male after which *upper-parts* are usually rather more tinged grey than in winter.

NESTLING (Plate 62).—At first rather thinly covered with somewhat short *down* (A) creamy-white and some very short tufts of *down* (B) white. Later thickly covered with longer and coarser *down* (C) which replaces *down* (B) (exactly



HYDERABAD ON.

1, Feathers of nestling Kestrel showing down (A) at tips. 2, Down (C) of same, showing down (B) at tips. 3, Under-down of feathered Kestrel. 4, Merlin a few days old, and 5, about a fortnight old.

as in Peregrine). *Down* (c) brown-grey on upper-parts, paler grey on under-parts, especially on chin, throat, tibia, and belly where it is grey only at base and otherwise white.

JUVENILE. MALE AND FEMALE.—Like adult female and so far as I can discover usually indistinguishable, but never so grey especially on rump as some adult females.

FIRST WINTER. MALE AND FEMALE.—Like juvenile.

FIRST SUMMER.—The juvenile body-plumage frequently commences to moult in Feb., Mar. and April, but wings and tail do not appear to be moulted before July and frequently moult is not complete until November, *i.e.* when bird is about 17 months old. When juvenile plumage is completely moulted males are indistinguishable from adult males and females from adult females.

MEASUREMENTS AND STRUCTURE.—♂ wing 193–210 mm., tail 116–127, tarsus 35–39, bill from cere 12–13 (12 measured). ♀ wing 210–233. Primaries (1st vestigial one not included): 2nd and 3rd longest, 1st 20–24 mm. shorter, 4th 14–20 shorter, 5th 26–35 shorter; 2nd and 3rd emarginated outer webs, 1st and 2nd very abruptly emarginated and attenuated near tip of inner web. Rest of structure as in Peregrine.

SOFT PARTS.—Bill blue-horn, blackish at tip, base of under mandible yellow; cere yellow (juv. bluish); bare skin round eye bluish; legs and feet yellow (paler in juv.); iris dark brown. *H.F.W.*

**Characters and allied forms.**—The Merlin can be distinguished from other British falcons by its small size, streaked under-parts, nuchal band, and want of moustachial stripe. *F. c. columbarius* (N.E. America) is darker than *F. c. æsalon* in both sexes and bars on wing-feathers whiter and on tail broader, and other American forms have been separated. Paler forms have been separated in *F. c. regulus* (Siberia), *F. c. insignis* (?=*alaudarius*) (E. Siberia), *F. c. christiani-ludovici* (=*pallidus*) (Kirghiz) and *F. c. lymani* (Altai), while *F. c. subæsalon* (Iceland) has been separated as darker (but this is inconstant) and larger (but measurements appear to overlap greatly). *H.F.W.*

*PLATES 62, 63, 65a, and 66.*

## 263. THE KESTREL—Falco tinnunculus tinnunculus L.

FALCO TINNUNCULUS Linnæus, Syst. Nat., ed. x, i, p. 90 (1758—Europe. Restricted typical locality: Sweden).
*Falco tinnunculus* Linnæus, Yarrell, i, p. 78; Saunders, p. 355.
*Falco tinnunculus tinnunculus* L., Pract. Handb., ii, p. 119.

**Habitat.**—Varied: well-timbered cultivated districts and open woodlands, bare moors, marshes, hill-country, and rocky coasts; also vicinity of old buildings, ruins, etc. *B.W.T.*

**Field-characters and General Habits.**—Habitual *hovering* (see below) is Kestrel's most distinctive feature. Coloration of male also characteristic: *bluish-grey head, rump and tail, last with black subterminal band, and black-spotted chestnut upper-parts*; under-parts buff with dark streaks and markings; quills mainly blackish. Head more or less tinged brown in young birds. Colours of female less striking, *rufous-brown with blackish barrings above, paler below with dark streaks; tail barred.* Apart from difference of coloration and streaked, not barred under-parts, *pointed wings* distinguish it from Sparrow-Hawk, which it resembles in rather long tail. For differences from Hobby and of hen from hen Merlin, see those species. Length *c.* 13–14 ins.; sexes not markedly different in size.

Perches on trees, overhead wires, walls or buildings, as well as fences, rocks, etc. ; sometimes on ground, but seldom for long except when plucking. Flight with rapid wing-beats and occasional short glide, more leisurely than Hobby or Merlin, usually about 20–30 ft. up (but see under "Display") and well out in open, not skulking along hedgerows, etc., within few feet of ground like Sparrow-Hawk. Course is constantly checked by bird hanging stationary, head to wind, with rapidly fanned wings and depressed and outspread tail, as it scans ground below. If no quarry is sighted it slips forward for a few yards and manœuvre is repeated until discovery of some beetle or small mammal rewards its search and it drops to earth to secure it. Extent of depression and spreading of tail varies with force of wind, and according to L. Tinbergen it is not spread at all in a gale.[1] In places where a strong up-current of air exists bird will hang poised with wings motionless. Drop to ground is seldom vertical, but generally more or less markedly slanting ; the area of ground surveyed by the hovering bird is considerable, and a Kestrel hovering at about 50 ft. will often land and secure prey at twice that distance from point above which it was poised (Tinbergen). Will also sometimes use fence or post as look-out, from which it flies down on insects, etc., detected in grass, and will also capture insects on the wing, though with much less adroitness than Hobby. When adult birds are taken they are generally secured by sudden dash whilst they are feeding or perched (but never by skulking methods of Sparrow-Hawk), being seized before they have taken wing or just after ; they are rarely, if ever, captured in full flight. They are generally plucked on the ground ; head often torn off and left (Tinbergen). Roosts in woodland or other trees, holes in masonry of old buildings, ruins, etc., and in clefts of rocks. Usually singly or in pairs ; sometimes several adults together, and young keep with parents till late Aug. or Sept. Pellets resemble those of Little Owl, but tend to be narrower in girth, are usually harder and more compact and often taper to thread at one end ; measurements c. 30–40 × 15 mm. *B.W.T.*

**Voice.**—Usual cry a loud, shrill "kee-kee-kee," "kik-kik-kik," "kee-lee, kee-lee," etc., with some variation in form and pitch ; sometimes a single "kik." Also, when excited, a musical soft, rippling "wrreee." Note of male bringing food to female, described as a soft "triii" (L. Schuster), is probably the same. Sometimes noisy at breeding-places, but otherwise rather silent, though chatter may fairly often be heard outside breeding-season during play or chases in the air and sometimes even from single birds. Young nestlings have a shrill "zhrr, zhrr" (A. Voigt), but older nestlings have note much like parents. *B.W.T.*

**Display and Posturing.** Display is not as a rule so conspicuous as in some other falcons. Male pursues female in aerial evolutions, generally circling above her and sometimes sailing round her while perched, performance ending with series of stoops in which he may even brush female with wings (A. Labitte). J. S. Huxley has described similar performance in which male repeatedly beat up wind and then bore down at headlong speed on female, which was sitting on bush, shooting up vertically when he seemed bound to strike her, and repeating the display. D. N.-Thompson has watched female selecting nest-site, going from one ledge to another followed by male, which finally flew on to her back with raised wings as she was inspecting a ledge; during coition wings of male were fluttered and tail spread. Coition is also described on branch of tree (Labitte, L. v. Kalitsch, E. Hansgeorg), on old nest, but not necessarily that in which eggs will be laid (Labitte), or on ground (Hansgeorg); sometimes at any rate accompanied by loud chatter of male, and Hansgeorg also mentions soft notes of female. Both N.-Thompson and L. S. V. Venables have observed what appears to be attempted coition in air; latter observer saw one of two birds circling together on Apr. 20 alight momentarily several times on back of other, which rose to meet it, both fluttering wings and expanding tails during these encounters. R. H. Brown has described a peculiar flight suggesting display, but witnessed in Nov., in which male rose to moderate altitude by rapid wing-beats, then glided downwards on motionless wings for about four times distance covered in rising, continuing this till out of sight. *F.C.R.J. & B.W.T.*

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[1] It will be understood that the hovering bird is only stationary with reference to the ground ; actually it is moving forward at a pace adjusted to the speed of the wind in the opposite direction. The spread tail increases the lifting surfaces, enabling the bird to maintain height in light winds, *i.e.* when its airspeed is low, very light winds requiring full fanning. The depression of the tail increases the angle at which the air strikes it, resulting in still further lift. In stronger winds, in which the bird must fly faster to maintain itself above a given point on the ground, the lift derived from the main lifting surfaces is sufficient to enable it to maintain height without fanning the tail.

**Breeding.** Makes no nest, but eggs are laid in scrape on ledge of cliff, often sheltered by ivy: in wooded districts in old and flattened nests of Crow or Magpie, more seldom in those of Raven, Rook, Sparrow-Hawk, Buzzard, Heron, or squirrel. Also occasionally in hollow in trunk of tree, or in recess in ruins, holes, or ledges in buildings, in windmills, and exceptionally on ground. Pellets are often ejected in nest and add to nesting material when disintegrated. *Eggs.*—Usually 4–5, 6 at times, rarely 7, but 8 and even 9 recorded, though two hens have been known to lay together. Shape blunt ovate, ground-colour white freely washed and blotched with dark red-brown, so that frequently ground is quite hidden, though in other cases a good deal of white is visible, and ashy or violet shell-marks are also found. Some types have quite pale, yellowish-brown markings, but on the average Kestrels' eggs are much darker than those of either Lesser Kestrel or Hobby and in this respect come close to those of Merlin. A clutch of white eggs has also been recorded. Average of 100 British eggs, 39·73×31·77. Max.: 43·7×33·5 and 41·5×34·2. Min.: 35·4×29·7 mm. *Breeding-season.*—Usually from mid-April in S. and mid-May in N. England: exceptionally from beginning of April and last days March. *Incubation.*—Eggs are laid at intervals of at least 2 days, but at times 3 or even 4: incubation may begin with first egg, but also on completion of clutch. Mainly by female, but male also takes a small part. Male brings food to perch and transfers to female. Period (27) 28 (29) days. *Fledging.*—At first female broods and male provides food, often transferring to hen to feed: later both sexes bring food to nest. Period usually 27–30 days; sometimes a few days longer. Young fed by parents after fledging. Single-brooded. *F.C.R.J.*

**Food.**—W. E. Collinge (on evidence of 80 stomachs) estimates animal food at 99% and vegetable matter 1%; 64·5% consisted of mice and voles, 8·5% small birds, 6% nestlings, 16·5% injurious insects, 2·5% earthworms, and 1% frogs. Mammals are the staple food, mainly field-mice and field-vole, also bank-vole, house-mouse, rat, water-vole, mole and shrew in smaller numbers, exceptionally bats (noctule and pipistrelle) and young rabbits. Once weasel and decapitated leveret: also seen attacking stoat. Birds include usually smaller species: Starling, Greenfinch, Linnet, Redpoll, Chaffinch, Goldfinch, Siskin, Yellow Bunting, Sparrow, Sky-Lark, Meadow- and Rock-Pipit, Blue and Long-tailed Tit, Fieldfare, Song-Thrush, Blackbird, Hedge-Sparrow, Martins, and Swifts. Larger birds occasionally: Sandpiper, Snipe, Turtle-Dove, wounded Redshank, Lapwings (ad. and young): seen devouring Wood-Pigeon and Hooded Crow and attacking Green Woodpecker! As a rule harmless to game and poultry, but individual birds will take young Pheasants, Partridges, and quite exceptionally Red Grouse in early stages or domestic chickens. Frogs, lizards, slow-worms, and adder also taken, and frequently insects, chiefly Orthoptera (grasshoppers), Dermaptera (*Forficula*), Lepidoptera (larvæ of *Noctuidæ*, etc.), Coleoptera (*Geotrupes*, *Melolontha*, *Rhizotrogus*), Diptera. Also earthworms: remains of snail-shells in pellets and exceptionally dead mammals or birds. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident, passage-migrant, and winter-visitor. Generally distributed, but leaves Shetlands for winter, and much rarer then in other parts of N. Scotland as well as in N. and E. Ireland. Recoveries of 65 British ringed nestlings indicate dispersal movement in autumn, majority travelling comparatively short distances, though a few that have travelled farther have all gone south. Only one yet recovered outside Brit. Is. (N. France). Well-marked passage movement of Continental birds (a young bird ringed Silesia was recovered Yorks in Nov. of following year) northern isles Scotland and E. coast Scotland and England, less well marked western isles Scotland, W. coast England and Wales, and E. coast Ireland, early Aug. to mid-Nov. (chiefly Sept.). Some pass inland and remain as winter-visitors to England, others continue south and leave S. coast. Return passage by same routes mid-Mar. to mid-May and occasionally June in northern isles. *H.F.W. & N.F.T.*

**Distribution Abroad.**—A Palæarctic and Ethiopian species, mainly resident. Typical race breeds in Europe, north to 70° in Norway, N. Sweden, N. Finland, Russia to 63° (recorded to 68¼°) and N. Urals: also in W. Siberia to Tarbagatai and Altai. In south to N. Africa, from Marocco to Tripoli and Cyrenaica, Mediterranean Is., N. Palestine, Syria, Iraq, Persia, N. Baluchistan, Himalayas east to Mongolia and the Amur. Replaced by other races in Madeira and W. Canaries (*F. t. canariensis*), E. Canaries (*F. t. dacotiæ*), Cape Verde Is. (*F. t. neglectus*), Nile and Jordan valleys (*F. t. rupicolæformis*): in E. Asia and south to Ceylon by other races: as also in Africa from Somaliland to the Cape, where there are at least two recognized races. Partial migrant, wintering south to tropical Africa and in S. Asia from Arabia to Burma and China. Accidental in N. America (Mass., U.S.A.), Iceland, Færoes, Bear Is., and Azores. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head creamy; crown, nape, and hind-neck blue-grey, frequently washed with rufous varying individually, each feather with a blackish shaft-streak varying in breadth individually but usually fine; mantle and scapulars pale chestnut-red often with a mauvy-pink tinge especially when freshly moulted, with arrowhead-shaped or drop-shaped subterminal black marks varying in size and number; upper-back as mantle but with only very small black marks; rest of back, rump, and upper tail-coverts blue-grey, feathers with rather darker shafts, and those of upper tail-coverts with indistinct greyish tips; (*sides of head*) lores as fore-head cream, which often extends over eye forming a more or less defined eye-stripe; ear-coverts ashy-grey, contrasting with darker, but not very clearly defined, blue-grey moustachial stripe; (*under-parts*) chin and throat pale cream to creamy-buff; breast, flanks, and belly pale buff varying in shade, feathers of upper-breast with brown-black shaft-streaks which on flanks and lower-breast become drop-shaped and sometimes broader arrowhead-shaped marks (these marks vary individually in size and number); middle of belly and under tail-coverts uniform pale buff; tibia same but more tinged rufous and occasionally with a few small black marks; axillaries and under wing-coverts white or creamy-white with large spots or incomplete bars of brown-black often marked rufous; *tail-feathers* blue-grey with greyish-white tips and broad black penultimate band, shafts brown-black, inner webs usually narrowly barred black but this barring varies greatly individually, being usually entirely absent and only occasionally strongly marked on central pair, on rest sometimes entirely absent, often only on basal part of inner webs, sometimes very faintly and sometimes very strongly marked; *primaries* brown-black very narrowly edged and tipped whitish, inner webs with comb-like bars of white often tinged rufous at points of "comb," especially on inner feathers, outermost *secondaries* as primaries but rest with an increasing amount of rufous on both webs until innermost which are like mantle; *primary-coverts* brown-black often with some rufous marks; rest of *wing-coverts* as mantle and scapulars. Individuals are to be found moulting body-plumage in every month of year (though most are in full moult from Aug. to Nov.), and it is difficult to be sure whether there are two moults of body-plumage or only one. Wings and tail certainly moult only once, commencing often in June and usually complete by Dec. (one just finishing in April!). In some individuals body-moult begins Jan. to April, and as many show no signs of moult in May and June this may indicate that there is a second spring moult of body-plumage as in Merlin.

ADULT FEMALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head creamy-white, feathers often with black shafts; crown and nape pale chestnut-red, streaked brown-black, sometimes with a blue-grey tinge especially on nape; mantle and scapulars chestnut-red thickly and widely barred black-brown, sometimes much less thickly barred, especially in middle of mantle where bars are frequently reduced to wide arrowhead marks; upper-back as mantle but bars narrower and sometimes reduced to spots; lower-back sometimes same but usually like rump and upper tail-coverts dull blue-grey with blackish shaft-streaks, usually with greyish-black bars and more or less tinged rufous; (*sides of head*) lores as fore-head, creamy-white which usually extends over eye; ear-coverts more hoary and finely streaked black-brown; moustachial stripe brown and less well defined than in adult male; *under-parts* as in adult male, ground-colour varying in shade and streaks also varying but never so reduced in size or number as in adult male; *tail-feathers* pale chestnut-red with varying amount of grey tinge (occasionally no grey tinge and occasionally brownish-grey with no red), tips buff to creamy-white, brown-black subterminal band, rest of feather narrowly and rather closely barred brown-black, bars sometimes absent from or reduced to spots on distal portion; *primaries* much as adult male but inner feathers with more rufous bars; *secondaries* barred rufous and brown with white edging to inner webs; *primary-coverts* black-brown barred rufous; *greater coverts* as barred scapulars; *median* and *lesser coverts* barred and spotted as mantle. Moult as adult male.

NESTLING (Plate 62).—At first somewhat thinly covered with rather short *down* (A) and very short *down* (B) both white. Cere, lores, round eyes, and patch at sides of neck bare. Later thickly covered with longer and coarser *down* (C) which replaces *down* (B) (exactly as in Peregrine). *Down* (C) pale buffish-grey on upper-parts and still paler on under-parts.

JUVENILE. MALE AND FEMALE.—*Upper-parts* as adult female but mantle, scapulars, and wing-coverts more widely and evenly barred dark brown to blackish-brown, back, rump, and upper tail-coverts as mantle but paler and sometimes with a tinge of grey at base; *under-parts* as adult female but more widely streaked with a rather paler shade of brown; *tail* rufous as rest of upper-parts, usually without any grey, but occasionally with a tinge of grey at base, and rarely male with considerable amount of grey, evenly barred brown-black, width of bars varying individually; *wing-feathers* as adult female.

FIRST WINTER AND SUMMER. MALE.—As in adult moult is gradual and some individuals commence much later than others. Moreover, moult even of body-feathers is usually very incomplete, while wing-coverts are often not moulted at all and never completely; wing-feathers are not moulted, but occasionally one or two tail-feathers are, but this is probably accidental. Moult extends from Aug. to April. Plumage is thus always a mixture, number of new feathers varying greatly individually. New feathers of (*upper-parts*) crown and nape rufous, often, but not always, with grey tinge and rather finely streaked black-brown, other new feathers much as adult male but those of mantle, scapulars, *breast* and *wing-coverts* with longer brown-black spots and sometimes with broad bars. Easily distinguished from adult female by mixture of plumage and by new feathers of mantle being of a pinker tinge with generally smaller subterminal blackish spots.

SECOND WINTER AND SUMMER. MALE.—Much like adult male, but crown rufous or heavily washed with rufous and moult of tail and wings apparently frequently incomplete so that some rufous, barred feathers remain even in April and May (*i.e.* when bird is two years old). Some examples have *tail-feathers* brownish-grey barred grey-black, and rump and upper tail-coverts brownish-grey with dark centres and often bars; others have *tails* pale rufous, more or less tinged grey and with narrow and often incomplete bars. Often much like adult female but new feathers of mantle pinker and with small black spots.

THIRD WINTER AND SUMMER. MALE.—After third moult beginning June or July, bird appears to become like fully adult, *i.e.* when between two and three years old.

FIRST WINTER AND SUMMER. FEMALE.—As in first winter male moult gradual and individuals varying in period and number of feathers moulted but moult seems always even more incomplete than in male. New feathers of (*upper-parts*) crown, nape, mantle, scapulars, and *wing-coverts* (very few wing-coverts moulted) usually less broadly streaked and barred than in juvenile; new feathers of rump and upper tail-coverts dull bluish-grey often tinged rufous and with brown bars and blackish subterminal shaft-streaks, more barred and less pure grey than is usual in adult female; *under-parts* much as juvenile. Easily distinguished from adult female by mixture of plumages and more heavily barred and less grey tail.

SECOND WINTER AND SUMMER. FEMALE.—Very difficult to trace sequence in female owing to want of distinct differences, which do not vary individually. New feathers in birds moulting into second winter and summer vary as those of adult, some having very grey or finely barred *tails*, greyish napes and light marked mantles, while others have these distinctions much less clearly marked, and *upper-* and *under-parts* much as first winter and summer, but *tails* always either greyer or more finely barred. *N.B.*—Females breed in their first summer.

MEASUREMENTS AND STRUCTURE.—♂ wing 230–252 mm., tail 150–173, tarsus 37–41, bill from cere 13–15 (15 measured). ♀ wing 235–267. Primaries (1st vestigial one not included): 2nd longest, 3rd sometimes as long but usually 1–6 mm. shorter, 1st and 4th 18–24 shorter, 5th 35–45 shorter, 6th 48–60 shorter; 2nd emarginated outer web, 3rd less clearly so (varying); 1st very abruptly emarginated and attenuated near tip of inner web, 2nd much less clearly so. Tail considerably rounded. Other structure as in Peregrine Falcon.

SOFT PARTS.—Bill blue-horn, base pale horn, tip blackish; cere and bare skin round eye yellow; legs and feet yellow, claws blackish; iris brown; "inside mouth (male and female); palate light slate-blue, paler in middle between pink ridges; lower mandible margined with blue; floor of mouth pink, tongue blackish; gape edged yellow" (W. H. Dobie). *H.F.W.*

**Characters and allied forms.**—All forms of Kestrel require careful comparison of series owing to individual variation. For differences of Lesser Kestrel, see "Characters" under that species. *F. t. dacotiæ* (E. Canary Is.) is smaller, more rufous on under-parts and adult male with larger black marks on mantle, scapulars and wing-coverts, *F. t. canariensis* (W. Canary Is.) as last but considerably darker on upper- and under-parts and crown of adult male browner and streaked, *F. t. neglectus* (Cape Verde Is.) is intermediate in colour between above two, *F. t. carlo* (tropical Africa) is also small and of a deeper and richer rufous on upper-parts than *F. t. canariensis*, *F. t. rupicolæformis* (Egypt) is intermediate in size and colour between *F. t. carlo* and *F. t. tinnunculus*; a number of other forms from Africa and Asia have been described. *H.F.W.*

*PLATE 64.*

## 264. THE LESSER KESTREL—Falco naumanni naumanni Fleisch.

Falco Naumanni Fleischer, Sylvan, Jahrbuch auf 1817 und 1818, p. 174 (1818—Visitor to S. Germany and Switzerland).
*Falco cenchris*, Yarrell, i, p. 82 (in text); Saunders, p. 357.
*Falco naumanni naumanni* Fleisch., Pract. Handb., ii, p. 124.

**Habitat.**—In breeding-season frequents especially the vicinity of old buildings and ruins, often in towns and villages, as well as sometimes that of cliffs, hunting over any sort of open country. *B.W.T.*

**Field-characters and General Habits.**—Closely resembles common Kestrel, but *much more gregarious* in habits, often swarming about old buildings of S. Europe and N. Africa, where it nests in colonies, and hawking all day long in company near the breeding-places or over neighbouring country. Male is rather smaller and more delicately built than Kestrel and more brightly coloured, with *richer red and unspotted mantle* and head and tail often looking almost blue in sunlight. Female can generally only be distinguished from Kestrel by size, which is often impossible to judge in field unless larger species is present for comparison. A further character (common to both sexes) is usually whitish colour of claws, but this requires closer observation than is usually possible with isolated birds, though at breeding-places in buildings (where identity is not in doubt) it can often be made out quite easily, the birds being very fearless. Length *c.* 12 ins.

Apart from its gregariousness, habits, including hovering, hardly differ from those of Kestrel, except that on the whole it does not hover so much and is more addicted to almost Swallow-like hawking after insects in the air. In winter-quarters apparently less social than in breeding-season; "flocks disperse and scattered individuals are seen from time to time" (V. G. L. van Someren). Flocking again takes place prior to departure. *B.W.T.*

**Voice.**—Birds are noisy about breeding-places, notes appearing more varied than those of Kestrel. Commonest is "kik-kik-kik-kik," rather rattling and rasping, but not unmusical, with well-marked disyllabic variant, a rasping "kihik." A sex-note, heard chiefly during coition, but occasionally at other times, is a penetrating, low chattering (F. N. Chasen). *B.W.T.*

**Display and Posturing.**—Male feeds female with great solicitude, prey being transferred to bill before presentation. Coition usually observed on topmost slender twig of tree, where both birds had to extend wings and strive hard to maintain balance (F. N. Chasen). *F.C.R.J. & B.W.T.*

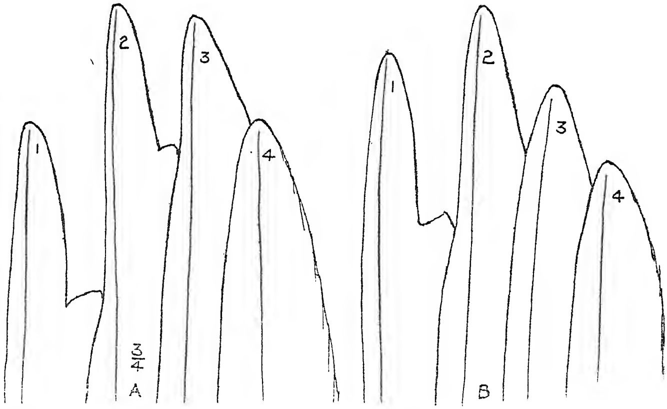
**Breeding.**—A decidedly sociable species, breeding as a rule in colonies, which vary in size according to number of sites available, but 15 to 25 pairs not uncommon, and at times up to 100. No nest is made, the eggs being laid in a scrape in a hole, usually in high buildings or old town walls. Occasionally a few pairs may be found breeding in recesses in cliffs, and colony has been recorded in old pollarded trees with numerous holes. *Eggs.*—Usually 5, 4 at times and 3 only or 6 occasionally, decidedly smaller than those of Kestrel, and with characteristic colouring of light yellowish-red on white ground. Pure white eggs occur occasionally and some are boldly marked with sienna and show much of the white ground. The difference between the eggs of the two species is very striking in a series. Average of 100 eggs (32 by E. Rey), 34·78×28·66. Max.: 37·5×31. Min.: 31·6×27·7 and 35·6×26 mm. *Breeding-season.*—Usually full clutches about 2nd or 3rd week of May, but occasionally in last week of April. *Incubation.*—Chiefly by female, but about one in every 15 or 20 examined on the nest is a male, so evidently he takes some part. Period 28 days (Engelmann). *Fledging.*—Young fed by both sexes at any rate in later stages. Single-brooded. *F.C.R.J.*

**Food.**—Largely insects: Orthoptera (locusts and grasshoppers, *Gryllotalpa*, etc.), Lepidoptera (caterpillars), Coleoptera (*Carabidæ*, *Cicindela*, *Ateuchus*), Diptera, etc. Also scorpions, Arachnida, small red centipedes (78 in one crop, R. Meinertzhagen), and lizards not infrequently taken. Young in Anatolia fed chiefly on mice (L. N. G. Ramsay) and frogs and small birds also occasionally reported. *F.C.R.J.*

**Distribution.**—*British Isles.*—Very rare vagrant. Ten times *England*—Yorks, Nov., 1867, April, 1892, Oct., 1909. Kent, May, 1877. Scilly Is., March, 1891, Feb., 1926 (another reported seen May, 1925). Is. of Wight, Nov., 1895, April, 1903. Sussex, May, 1896, April, 1914. Once *Scotland* (Aberdeen, Oct., 1897). Once *Ireland* (Dublin, Feb., 1891). Chiefly adult males. *H.F.W.*

**Distribution Abroad.**—Summer-resident in Mediterranean region and W. Asia. Typical race breeds in Europe north to S. Portugal, central Spain, Italy, Carinthia, S. Czecho-Slovakia, Hungary, S. Poland, Romania, Russia north to Volhynia, Kiev, Don Cossacks and S. Samara Govt. In south from Marocco to Tunisia, Greece, Asia Minor, Syria, Palestine, Armenia, Iraq, Persia. In Mediterranean only in Sardinia, Sicily, Crete, and Cyprus. Replaced by allied race (*F. n. pekinensis*) from E. Ukraine, Transcaspia and S.W. Siberia to N. China; irregular visitor to India. Typical race winters tropical and S. Africa, passing through N. Africa. Casual in Germany, Heligoland, S. France, Switzerland, and N. Russia. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—*Upper-parts* as adult ♂ Kestrel but crown paler blue-grey and seldom washed rufous and feathers with only slightly darker grey shafts and very rarely with definitely dark brown shafts; mantle, scapulars, and back unspotted, uniform pale chestnut-red, some outer scapulars with varying amount of blue-grey subterminally; rump and upper tail-coverts blue-grey, feathers with darker shafts; (*sides of head*) ear-coverts and sides of neck as crown but ear-coverts with slightly hoary streaks and round eye darker blue-grey; (*under-parts*) base of feathers of lores, chin, and throat creamy-buff contrasting sharply with grey sides of neck and with breast and flanks, which are pinkish-buff with black-brown spots varying in size and number, often absent from upper-breast and occasionally absent altogether from under-parts; middle of belly and under tail-coverts paler creamy-buff and sometimes tinged grey; axillaries varying shade of pinkish-buff and grey and with varying number of black-brown spots; under wing-coverts white usually tinged cream and occasionally slightly washed rufous, with varying number of black-brown spots (very rarely entirely absent); *tail-feathers* as in Kestrel blue-grey with blackish shafts, broad black subterminal band and whitish tips, but inner webs never barred; *primaries* brown-black very narrowly edged and tipped whitish, inner edges and bases of inner webs white mottled brown, very rarely with indications of comb-like marks; *outer secondaries* same but outer webs greyer, *inner secondaries* blue-grey with varying amount of chestnut-red; *primary-coverts* brown-black; *greater coverts* blue-grey with varying amount of chestnut-red, usually absent from outer feathers and usually considerably more on inner feathers; *median* and *lesser coverts* chestnut-red as mantle but outer feathers of median usually and of lesser more rarely with varying amount of blue-grey. This plumage is acquired by a gradual moult extending from June to Jan.



Wing-formula of: A. The Kestrel (*Falco t. tinnunculus*). Outer visible primaries: 1st and 2nd notched on inner web and 2nd and 3rd emarginated on outer, 1st always considerably shorter than 3rd. B. The Lesser Kestrel (*F. n. naumanni*). 2nd not notched on inner web, 3rd not emarginated on outer web, 1st usually longer and only occasionally shorter than 3rd.

ADULT FEMALE. WINTER AND SUMMER.—Like adult female Kestrel and not to be distinguished with certainty by coloration, but brown-black bars on *upper-parts* usually narrower and moustachial stripe usually very ill defined. Moult as in adult male.

NESTLING.—Like Kestrel but *down* (A) and (B) purer white and *down* (C) also white not buffish-grey. (Claws white.)

JUVENILE. MALE AND FEMALE.—Like that of *F. t. tinnunculus* but *upper-parts* and *tail* with brown-black bars less broad than is usual in juvenile Kestrel, rump and upper tail-coverts often with considerable amount of grey tinge and moustachial stripe very ill defined. In male *tail-feathers* are often blue-grey with a few black bars and a tinge of rufous.

FIRST WINTER AND SUMMER. MALE.—As in adult moult is gradual, beginning in Nov. or Dec. and continuing to March. Moult of body-feathers and wing-coverts usually more complete than in Kestrel, wing-feathers not moulted but central two or three pairs of tail-feathers and sometimes all tail-feathers are moulted. New feathers of *body* and *wing-coverts* as in adult male but those of crown usually tipped rufous, and those of nape often with blackish shaft-streak and here and there on mantle and wing-coverts small black streaks or dots. In those individuals which have blue-grey juvenile *tail-feathers* these when worn lose rufous tinge and are much like those of adult except for their black bars.

FIRST WINTER AND SUMMER. FEMALE.—Moult as in male. New feathers like those of adult female more rufous than the worn and paler juvenile feathers, especially on nape, and not so pale at tips and rather less widely barred, especially on wing-coverts.

SECOND WINTER AND SUMMER. MALE AND FEMALE.—When completely moulted indistinguishable from adults.

MEASUREMENTS AND STRUCTURE.—♂ wing 224–244 mm., tail 135–150, tarsus 30–33, bill from cere 12–14 (12 measured). ♀ wing 224–246. Primaries (1st vestigial one not included): 2nd longest, 1st and 3rd 5–15 mm. shorter, 4th 20–28 shorter, 5th 38–47 shorter, 6th 55–65 shorter; 2nd emarginated outer web, 1st very abruptly emarginated and attenuated near tip of inner web, 2nd not emarginated on inner web. Tail considerably rounded. Other structure as in Peregrine Falcon.

SOFT PARTS.—Bill dark blue-grey, base orange and tip blue-black; cere, gape, eyelids, and bare skin round eyes yellow; legs and feet orange-yellow (♂) yellow (♀ and juv.), claws pale brown to whitish, or brown (sometimes black, M. J. Nicoll, *Ibis*, 1912, p. 436); iris dark brown. *H.F.W.*

**Characters and allied forms.**—Adult male easily distinguished from Kestrel by unspotted upper-parts and blue-grey ear-coverts and sides of neck, female and young by wing-formula, emarginations of primaries, smaller size, finer bill, legs and feet, and paler claws. *F. n. pekinensis* (E. Asia) has more grey on median and lesser wing-coverts, but this character is variable as is colour of mantle. *H.F.W.*

*PLATE 62.*

## 265. THE RED-FOOTED FALCON—Falco vespertinus vespertinus L.

FALCO VESPERTINUS Linnæus, Syst. Nat., ed. xii, i, p. 129 (1766—"Ingria," *i.e.* province of St. Petersburg).
*Falco vespertinus* Linnæus, Yarrell, i, p. 69; Saunders, p. 353.
*Falco vespertinus vespertinus* L., Pract. Handb., ii, p. 127.

**Habitat.**—In breeding-season chiefly frequents plains and steppe country with scattered groves and clumps of trees, meadows with scattered bushes, and borders of forest within reach of open ground of the type described; often near farms and habitations, though not in towns like Lesser Kestrel. *B.W.T.*

**Field-characters and General Habits.**—Size, shape, and flight very like Kestrel, but rather more finely built and much more gregarious. Though frequently seen singly, is commonly met with in flocks, often of considerable size, when presence of very distinctive dark-coloured males simplifies recognition. *Male is dark slate-grey*, slightly paler below, *vent and under tail-coverts* *chestnut*; legs, cere, and round eye orange-red. Less distinctive female shows *crown, nape, and under-parts rufous buff*, fore-head, throat, and sides of face paler, blackish round eye, and upper-parts slate-grey barred darker. Young birds something like female, but with rufous edgings to feathers of upper-parts, and under-parts pale buff or creamy with broad brown streaks; nape sometimes whitish; legs yellow. Wings reach nearly to tip of tail and young are much like young Hobbies, but differ in less boldly marked under-parts, with brown, not black, markings, pale fore-head, paler upper-parts with more definite light bars and tail usually strongly barred above and below, much like hen Kestrel, whereas tail of young Hobby, though barred beneath, appears uniform slaty above when at rest and even when spread shows only rather faint barring. Length *c.* 11–12 ins.; sexes do not differ appreciably in size.

Flight, see above. Hovers like Kestrel, but not so persistently, and usually hunts in fairly open ground with trees here and there, on top of which it often perches. Also often perches on telegraph-wires, as well as on low bushes, hedges, fences, etc., and freely on ground. Can run with ease and speed (Lilford). Rather markedly crepuscular, frequently hunting late in evening. In addition to hunting by hovering method, will hawk insects in air or dart down from look-out to seize prey on ground. Occasionally even captures flying small birds (G. Niethammer). Roosts in trees, members of flock close together (A. v. Nordmann). Males appear to be generally more numerous than females. *B.W.T.*

**Voice.**—Note much like Kestrel, but slightly sharper (H.F.W.); a Lesser Spotted Woodpecker-like "ki ki ki ki," slower and more "mournful" than Kestrel (G. Niethammer). *B.W.T.*

**Display and Posturing.**—Sexual behaviour not recorded, but A. v. Nordmann describes remarkable social evolutions of flocks before nesting commences, birds flying to and fro for hours over same beat, turning sharply at fixed points; beginning about 4 p.m., high up, and descending lower towards evening. *F.C.R.J. & B.W.T.*

**Breeding.**—Shows a strong sociable tendency, but is dependent on nests of other species for sites and does not build. Rookeries are occupied by great numbers of pairs after the young Rooks have flown, and when unfavourable conditions make the Rooks late, the Falcons are forced to wait for them. Old nests of Magpie and Hooded Crow are also used, and apparently also occasionally holes in trees, as with Kestrel. *Eggs.*—Commonest clutch is 4, sometimes 5, also 3 occasionally, while 6 is said to occur. In appearance rounded ovoid, resembling those of Kestrel in colour and range of markings, but decidedly smaller. Markings nearly always dark, rich red-brown, with varieties showing white ground. Average of 100 eggs (40 by E. Rey), 36·8 × 29·22. Max.: 41·5 × 30·5 and 40 × 32. Min.: 33·8 × 29·4 and 36·5 × 27·3 mm. *Breeding-season.*—Latter part of May and early June: many eggs dropped by waiting birds. *Incubation.*—Both sexes take part and male has incubation patches (G. Janda). Period not precisely known. *Fledging.*—Young while quite small, fed by female: male providing food: later both sexes bring food to young. Single-brooded. *F.C.R.J.*

**Food.**—Mainly insects: Orthoptera (locusts, grasshoppers, and *Gryllus campestris, Gryllotalpa*), Odonata, Hemiptera (larvæ of *Cicadidæ*), Lepidoptera (large moths and caterpillars of *Diloba cæruleocephala* and *Mamestra* *pisi*), Coleoptera (*Cicindelidæ, Carabidæ, Procrustes, Necrophorus, Ateuchus, Geotrupes, Melolontha, Pentodon, Rhizotrogus*, etc.): Hymenoptera (*Apidæ*) and Diptera (*Tipulidæ*). Also frogs, lizards, and small mammals (field-voles, *Microtus arvalis*, and shrews). British records are few (shrews, mouse, poultry chicks, dragon-flies, and beetles). In winter-quarters, Orthoptera (locusts) and Isoptera (white ants). *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. Most May, several June and April, occasional July-Oct., once early Nov., one or two winter records very doubtful. *England.*—Over sixty, chiefly E. and S. but rare S.W. and N.W., though has occurred Cornwall, Salop, Cheshire, Lancs, Cumberland, and Westmorland. *Wales.*—One Denbigh, one Glamorgan, and a doubtful Pembroke record. *Scotland.*—Four or five. Aberdeen (two or three), Fife, and Roxburgh. *Ireland.*—One Wicklow. *H.F.W.*

**Distribution Abroad.**—A Palæarctic summer-resident but absent from W. Europe. Typical race breeds in E. Europe north to S. Austria, Czecho-Slovakia, Hungary, E. Poland, Estonia, Russia to 65° N. and N. Urals. (Has probably also bred in Germany, Denmark, Finland, and E. Sweden.) In south to Yugo-Slavia, Macedonia, probably Bulgaria and Romania to Caucasus. Also Asia Minor, W. Siberia, Aralo-Caspian region, Semipalatinsk, Altai, and Tarbagatai. Replaced by allied race (*F. v. amurensis*) from Transbaikalia to Ussuria, Manchuria, and N. China. Winters in tropical and S. Africa, passing through N. Africa and S.W. Asia. Casual Russian Lapland, Norway, Heligoland, Holland, France, Belgium, Switzerland, Spain, Marocco, and Canaries. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—Whole *upper-parts* dark slate-grey, usually still darker, almost black, on upper tail-coverts; (*sides of head*) lores, ear-coverts, and cheeks as upper-parts; (*under-parts*) chin, throat, breast, flanks, paler slate-grey, feathers with dark grey shafts; centre of lower belly, vent, tibia, and under tail-coverts chestnut, under tail-coverts sometimes marked with dark slate-grey; axillaries and under wing-coverts dark slate-grey; *tail* black; *wing-feathers* grey with silvery-grey outer webs and black shafts; *greater* and *median* coverts rather paler grey than upper-parts; *lesser coverts* as upper-parts. This plumage is acquired by complete moult from July to March.

ADULT FEMALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head creamy-buff; whole crown and nape buffish-chestnut, feathers often with dark shaft-streaks, feathers of nape with pale buff bases showing more or less; mantle and scapulars dark slate-grey barred blackish, upper mantle more or less strongly washed rufous; back, rump, and upper tail-coverts paler slate-grey, barred blackish; (*sides of head*) patch in loral region and narrow line round eye black; moustachial stripe chestnut; ear-coverts, sides of neck, chin, and throat buff; rest of under-parts chestnut-buff (varying in shade) with a few fine blackish shaft-streaks chiefly on flanks and sometimes widening into narrow drop-like streaks; middle of belly, under tail-coverts, and tibial feathers unstreaked; axillaries and under wing-coverts chestnut-buff streaked, occasionally spotted and axillaries sometimes barred blackish-brown, under wing-coverts covering primaries buffish-white barred black-brown; *tail-feathers* pale slate-grey with narrow bars and broad subterminal band of brownish-black, tips often tinged rufous; *primaries* blackish, outer webs with silvery tinge, inner webs with comb-like marks of white to pale grey often tinged rufous; *secondaries* same but often barred greyish-black and with white comb-like marks confined to inner portion of inner webs, *innermost secondaries* and *wing-coverts* slate-grey barred blackish; *primary-coverts* slate-grey, outer webs with silvery tinge. Moult as in male.

NESTLING.—At first *down* (A) covering bird fairly well (round eyes and patch on sides of neck bare) but short and very short tufts of *down* (B) both white. Later thickly covered with longer and coarser *down* (C) which replaces *down* (B) (exactly as in Peregrine). *Down* (C) pale buffish-grey on upper-parts and paler on under-parts, like Kestrel but slightly darker.

JUVENILE. MALE AND FEMALE.—(*Upper-parts*) fore-head creamy-buff, feathers with blackish shafts; whole crown varying chestnut-buff to buffish-brown, narrowly streaked black; nape pale buff to buffish-white with thicker black streaks; rest of upper-parts brown-grey barred blackish and each feather broadly tipped rufous to buff or pale buff; (*sides of head*) patch in loral region, round eye and extending in short moustachial stripe black; rest of ear-coverts, sides of neck, chin, and throat creamy-white; rest of *under-parts* pale buff to creamy-white thickly streaked brown except tibia, vent, and under tail-coverts which are unstreaked; axillaries and under wing-coverts pale buff thickly barred dark brown and rufous-brown; *tail* varying, usually barred rufous and brownish-black with more or less tinge of slate-grey, sometimes (especially central pair) much more slate-grey only tinged rufous and with narrower bars of black, all tail-feathers tipped buffish-white; *wing-feathers* and *primary-coverts* as in adult female but with less grey tinge and tipped buffish-white; *innermost secondaries* and *wing-coverts* as upper-parts.

FIRST WINTER. MALE AND FEMALE.—Like juvenile.

FIRST SUMMER. MALE.—The juvenile body-feathers, some lesser and median wing-coverts, occasionally whole tail, but usually only one or two central pairs, moult gradually from Feb.-May, but not greater coverts, under wing-coverts, primary-coverts, or wing-feathers. New feathers of *upper-parts* as in adult male but tinged with brownish and with black shaft-lines, nape chestnut, *under-parts* as adult male but breast and flanks with varying amount of chestnut often only on basal portion of feathers and with black-brown shaft-streaks varying individually in width and number, new *tail-feathers* usually not quite so dark as in adult male and with a black subterminal band, sometimes clear but sometimes rather obscured and broken and sometimes with some narrow black bars on rest of feathers.

FIRST SUMMER. FEMALE.—Moult as in first summer male. (*Upper-parts*) crown and nape sometimes much as adult female, but usually paler and more streaked, rest of upper-parts usually more tinged with rufous, when worn crown becomes paler and more buff and upper-parts brownish; *under-parts* paler than in adult, sides of neck and throat usually creamy-buff, rest of under-parts pale chestnut-buff and with dark brown streaks varying individually in width and number but usually very prominent and often of drop-like shape, new *tail-feathers* as in adult female.

SECOND WINTER. MALE AND FEMALE.—Like adults. The rest of the juvenile feathers as well as the first summer feathers are replaced, moult commencing with wing-feathers in June (occasionally May), and sometimes not complete by Oct.

MEASUREMENTS AND STRUCTURE.—♂ wing 230–260 mm., tail 120–130, tarsus 28–30, bill from cere 12–13·5 (12 measured). ♀ wing 230–253. Primaries (1st vestigial one not included): 2nd longest, 1st 5–15 mm. shorter, 3rd 10–15 shorter, 4th 25–35 shorter, 5th 40–55 shorter; 2nd emarginated outer web, 1st very abruptly emarginated and attenuated near tip of inner web. Rest of structure as in Peregrine.

SOFT PARTS.—Bill bright orange, tip dark blue-grey, female and juvenile with base yellow and rest blue-grey; round eyes, cere, legs, and feet bright orange (paler and duller in juv.); iris blackish-brown. *H.F.W.*

**Characters and allied forms.**—Wing-formula and size, rufous vent and uniform dark slate of adult male, rufous crown and under-parts of female are distinctive. *F. v. amurensis* (E. Siberia, N. China) adult male has white axillaries and under wing-coverts, female with paler under-parts and blacker streaks than in *F. v. vespertinus*. *H.F.W.*

## Family ACCIPITRIDÆ.

Vomer without oval swelling and not touching maxillo-palatines. Palate indirectly desmognathous (maxillo-palatines only united through junction with inter-nasal septum) or schizognathous. Palatal surface of upper mandible without median ridge. 14–17 cervical vertebræ. Coracoid with small procoracoid process not reaching furculum. No fossa in mandible. Sternum without spina interna. Syrinx with external tympaniform membrane only indicated and intrinsic muscles inserted on one of the first three bronchial rings. Eggs white or blotched brown, tinted green internally. Containing eagles, buzzards, sparrow-hawks and allies, kites, harriers, and vultures. Many genera.

### Genus AQUILA Briss.

AQUILA Brisson, Ornith., i, p. 28 (1760—Type by tautonymy and general consent: "*Aquila*," *i.e.* the Golden Eagle, according to p. 419).

The real eagles, large birds with free, ear-shaped or round large nostrils. Bill strong, not with sharp but with flat, rounded "tooth," and without corresponding notch on lower mandible. 1st visible primary much shorter than 2nd, generally 4th and 5th longest, the outer 5 or more visible primaries deeply emarginated on inner webs. Tarsus feathered to toes, tail rounded. Eggs white or marked red-brown, greenish internally.

*PLATES 64, 65a, and 71.*

### 266. THE GOLDEN EAGLE—Aquila chrysaëtus chrysaëtus (L.)

FALCO CHRYSAËTOS Linnæus, Syst. Nat., ed. x, i, p. 88 (1758—Europe. Restricted typical locality: Sweden).
*Falco fulvus* Linnæus, Syst. Nat., ed. x, i, p. 88 (1758—Europe. ? Derbyshire and Wales ex Ray, see H. K. Swann, Bull. B.O.C., xlv, p. 64).
*Aquila fulva atlantica* Sewerzow, Mém. Soc. Imp. Natur. Moscou, xv, livr. 5, p. 182 (1888—Orkney, Scotland).
*Aquila chrysaëtus* (Linnæus), Yarrell, i, p. 11; Saunders, p. 327.
*Aquila chrysaëtus chrysaëtus* (L.), Pract. Handb., ii, p. 131.

**Habitat.**—Chiefly, and in Scotland almost exclusively, wild and barren mountainous tracts, rarely nesting above 3,000 ft. (D. N.-Thompson), most eyries between 900 and 2,000 ft. (H. B. Macpherson); more rarely in forested country in mountains and, locally abroad, even in plains; occasionally frequents sea-cliffs, and formerly bred in them in Britain. *B.W.T.*

**Field-characters and General Habits.**—Flight and outline in air, with broad wings and wide-spread, upward-curving primaries, recall those of Buzzard. At a distance much greater size is not always apparent and confusion between the two species is possible, but head of Eagle projects farther beyond front border of wings and both wings and tail are relatively rather longer, while occasional downward stroke of wings interrupting for a moment the majestic soaring flight conveys, even at long range, an impression of immense power peculiar to this and other raptors of comparable size. At closer range size alone is sufficient distinction and much more powerful bill gives different outline to head. *Plumage dark, varying in adults from almost uniform tawny to chocolate-brown with tinge of yellowish on head. Young birds have tail* *white, with broad black band at end and white bases to secondaries and inner primaries*, and are not infrequently confused with Sea-Eagle, from which, however, longer and squarer tail distinguishes present species at all ages (for other differences, see Sea-Eagle). Length *c.* 30–35 ins.; female averages larger than male.

Flight direct, with regular, leisurely, and powerful wing-beats, or gliding for long stretches with no perceptible movement of wings or now and again a single strong downward stroke (*cf.* above); frequently soars to great heights. Perches on crags or trees, and has often favourite places where it will sit immobile for hours. Gait a rather clumsy, almost waddling walk. When hunting it beats over the hillsides low down or comparatively so, flying down its quarry in a swift rush or swooping to seize it from ground; reliable observers describe it driving hares, etc., from cover by beating with its wings. Usually seen singly, but pairs will hunt in company in winter. Young remain with parents until winter. Lifting power has been much discussed: obviously much depends on wind conditions and whether bird can launch straight out from a hillside or has to rise. More evidence needed, but available data suggest that 10–11 lbs. is about the maximum on level ground (*cf.* correspondence in *Brit. B.*, vols. xiv, xv, xix). Three typical pellets measured 95×35, 83×35, and 88×40 mm. *B.W.T.*

**Voice.**—Usually a silent bird, but has three distinct cries: a thin, shrill yelp, rarely heard near nest; a whistling, Buzzard-like "twee-o," an alarm note; barking cries (D. N.-Thompson). *B.W.T.*

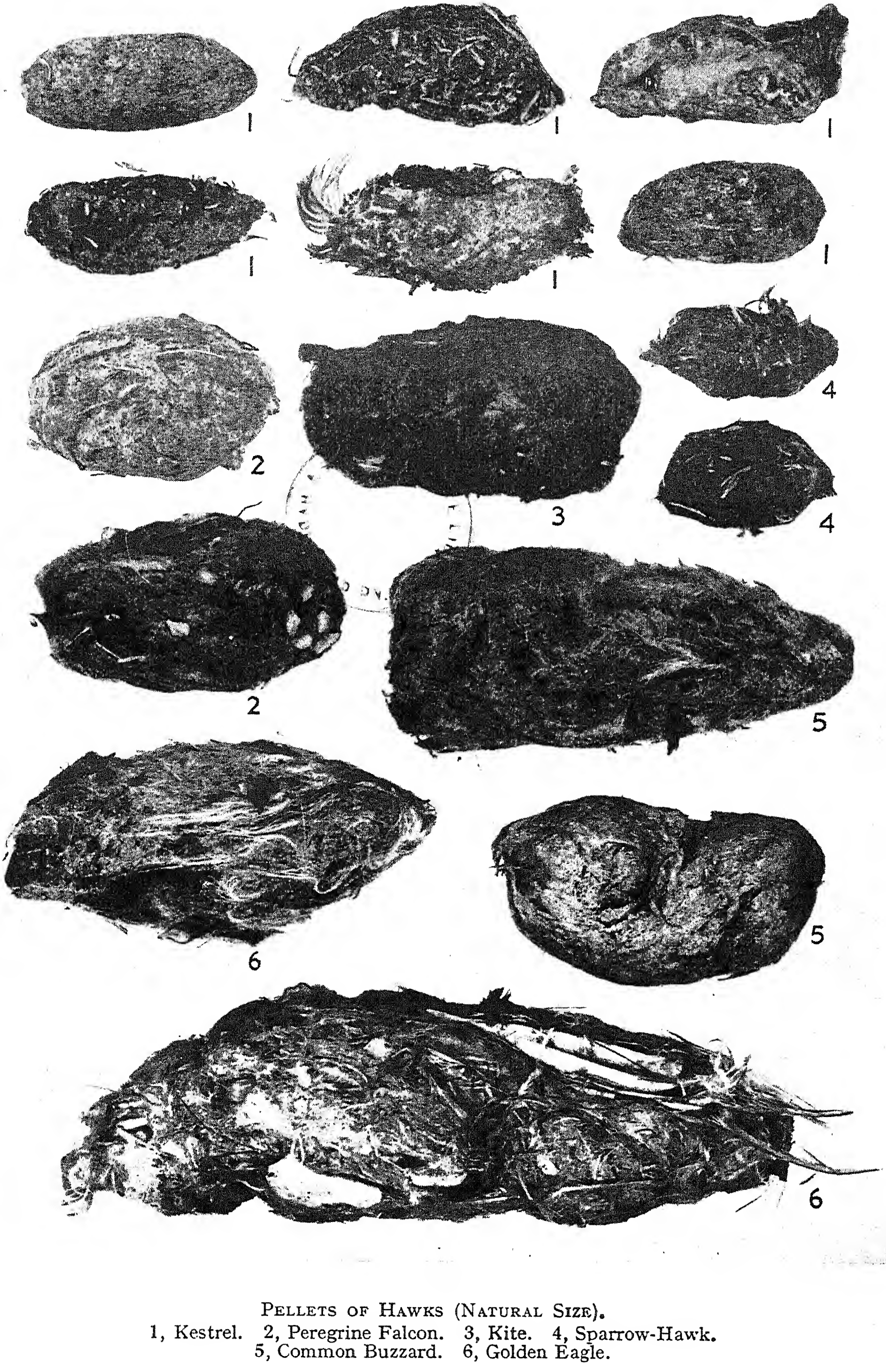
**Display and Posturing.**—In breeding-season male and female soar in spirals to a great elevation with mewing notes and sometimes indulge in succession of headlong dives from a height with half-closed wings and upward sweep at end of each plunge in manner common to many birds-of-prey. D. N.-Thompson describes an "advertisement" flight of male soaring over territory in early part of season, and various evolutions of male and female together, *e.g.* circling round one another, male rolling over above female, which also half turns over on back, male diving at female, which may or may not turn over, male swinging over female with wings raised at angle of 45°. Male also sometimes chases female, and both seen to swoop into nesting-wood with half-closed wings, male following female. Coition seen (Mar. 26, several miles from nest) a few days before eggs laid; after nuptial flight both alighted on bare hillside. Male flew a few yards and waddled up to female; during coition wings of male were raised and shaken. *F.C.R.J. & B.W.T.*

**Breeding.**—Formerly bred on sea-cliffs in many places, but now confined to moorlands, usually deer-forests. *Nest.*—Frequently on ledge of cliff, but some sites are very easy of access: exceptionally on ground, among boulders: in a few cases in trees, generally Scots pine, but has bred in birch. Sometimes same nest is used for many years, but alternately used sites, when available, are more frequent. Nest is a bulky structure, built by the birds themselves, both sexes bringing material and also adding to it throughout breeding-season. Foundation of branches of trees in wooded country, but heather stems also freely used, often entirely. In west bracken much favoured material. A good deal of dead grass in lining, decorated with wood-rush (*Luzula sylvatica*), polypodium fern or fresh green pine branches. *Eggs.*—Normally 2, occasionally 1 only, and rarely 3, while 4 have once been recorded, laid at intervals of 3–4 days as a rule: usually blunt oval, but exceptionally pointed in shape. One egg often white or nearly so, while the other is flecked and spotted with various shades of red-brown and ash-grey: at other times both eggs marked, some only slightly, others heavily with blotches and spots so that little of the white ground is visible. Sets of 2 white eggs also occur. Average size of 100 British eggs, 77·02×59·48. Max.: 88·9×66. Min.: 70·3×56 and 77·6×51 mm. *Breeding-season.*—Begins late in March: usually fresh eggs about Apr. 1–10. *Incubation.*—Almost entirely by hen, but evidence of male occasionally taking some part: confirmed by evidence of birds in captivity. Male seen to feed hen once in early morning (D. N.-Thompson), but normally she leaves nest to feed. Period 44–45 days in confinement (Vökle): no positive data from Scotland, estimated at about 40 days. *Fledging.*—Both sexes provide food, but chiefly the male, which also at times broods and feeds young. Food brought to nest in feet, usually fed to young by hen until nearly 2 months old. Period at least 11 weeks. Single-brooded: but at times known to lay again after losing first clutch. *F.C.R.J.*

**Food.**—Varies to some extent according to locality. In deer-forests largely blue hares and Red Grouse or Ptarmigan, according to altitude: near sheep-walks young lambs not infrequently taken in spring. Probably in case of eyries on sea-cliffs (now unoccupied) sea-birds were largely taken. In Scotland red-deer calves are recorded as attacked: also roe-deer: carrion is devoured at times. There are also definite records of the following species: Mammalia (dog, fox and cubs, cat, young badger, young kid, rabbit, brown rat, stoat, weasel, squirrel, water-vole, and mole): birds (Hooded Crow, Raven, Rook, Jackdaw, Magpie, Meadow-Pipit, Heron, Lapwing, Golden Plover, Curlew, Black Grouse, and gull (sp.?), seen to strike Grey Lag-Goose: said to have killed swan (sp.?)). Fish (salmon and pike) have also been recorded. *F.C.R.J.*

**Distribution.**—*England and Wales.*—Very rare vagrant. Occasionally Yorks and northwards, but southwards authentic examples procured only in Sussex, Berks, Norfolk, Lincs, Northants, Carmarthen. Formerly resident Wales, Derby (about 200 years ago), Lake District (towards end eighteenth century), and Cheviots (about 100 years ago). *Scotland.*—Resident in Highlands and I. and O. Hebrides, formerly Orkneys, but unknown Shetlands. To Lowlands very scarce visitor, but formerly bred in south-west and has bred there in recent years. *Ireland.*—Formerly widespread but gradually exterminated, last bred Donegal 1910, and a pair probably Mayo a few years later; last Donegal bird trapped 1926, and one frequented Antrim 1926–1930. *H.F.W.*

**Distribution Abroad.**—A Holarctic resident species. In Europe breeds north to 70° in Norway, N. Sweden, Finland, and N. Russia to Urals; also W. Siberia to Semipalatinsk and N.E. Altai. Southward rare in Baltic states but breeds in mountain ranges of central Europe south to Pyrenees, Italy, Corsica, Sardinia, formerly Sicily, Yugo-Slavia, Albania, Greece, Crete, Bulgaria, Romania, and Caucasia. Also Asia Minor, W. Persia, Syrian desert, etc. Replaced by allied races in Iberian peninsula, Balearic Is., and N.W. Africa (*A. ch. homeyeri*), Transcaspia and Turkestan to Persia, Afghanistan, Baluchistan, and the Himalayas (*A. ch. hodgsoni*): also in N. America from Alaska to California (*A. ch. canadensis*). Typical race has occurred in Denmark, Holland, Belgium, and the Crimea. *F.C.R.J.*



Pellets of Hawks (Natural Size).
1, Kestrel. 2, Peregrine Falcon. 3, Kite. 4, Sparrow-Hawk.
5, Common Buzzard. 6, Golden Eagle.

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) feathers of crown, nape, and sides of neck lance-shaped, bases and shafts rufous-brown to dark brown, tips and edges bright tawny-buff, becoming much paler and often whitish when worn (fore-part and middle of crown usually darker than nape); mantle, scapulars, back, and rump dark or blackish-brown with a purplish sheen (becoming much paler brown when worn), bases of feathers white with a few brown markings, bases of scapulars much marbled with brown; central upper tail-coverts as rump, bases white or mottled or barred with white, lateral tail-coverts paler brown, often yellowish-brown at tips, bases more regularly barred white; (*sides of head*) feathers of lores bristle-like, black with short white tufts at base; ear-coverts as crown; *under-parts* much as upper-parts but not quite so dark and glossy, feathers of breast with more or less tawny edges; feathers of tibia and tarsus rufous-brown becoming paler and more buffish at base of toes, feathers with dark shafts; under tail-coverts rufous-brown with variable amount of darker brown mottling, bases white or whitish; axillaries dark brown with variable amount of rufous-brown; under wing-coverts dark brown, round bend of wing tawny and fading to whitish; *tail-feathers*, tips brown-black (8–12 cm.), rest irregularly banded dark grey and dark brown, paler on edges of inner webs of outer feathers; *wing-feathers* brown-black, basal three-fourths of inner webs of 5 or 6 *outer primaries* usually with some whitish streaks, basal part of inner and outer webs of rest of *primaries* and of *secondaries* with varying amount of grey-brown or grey mottling usually forming ill-defined bands, paler and often whitish on inner webs; *primary-coverts* and *greater coverts* black-brown mottled grey about the middle and white at base; *median* and *lesser coverts* same but not so blackish and lesser coverts round bend of wing edged tawny or whitish. This plumage is acquired by complete moult and insufficient moulting birds are available to determine exact period, but moult seems very gradual and individuals are scarcely ever in entirely perfect plumage, there being always some worn pale feathers.

NESTLING.—At first *down* (A) white with pale smoky-grey tips, very short *down* (B) purer white. Later a much longer, thicker and more "woolly" white or creamy-white *down* (C) replaces *down* (B) (exactly as in Peregrine). Back of tarsal joint bare and toes bare, otherwise bird very thickly and closely covered.

JUVENILE.—(*Upper-parts*) crown and nape darker and duller, not so "golden" as in adult; rest of *upper-parts* rather darker than in adult, especially tips of lateral upper tail-coverts; *under-parts* blacker than in adult, and feathers of breast without tawny edges; tibia and tarsus not so rufous, tarsus occasionally pure white and often white with brown marks; axillaries and under wing-coverts more uniform brown-black with little or no rufous; under-parts show more of the white bases of feathers than in adults; *tail-feathers* extreme tips whitish (soon become worn off), tips for about 10 to 16 cm. brown-black sometimes somewhat mottled greyish, remaining portion of feathers white more or less speckled with brown-black and mottled with grey between the black tip and the base which is uniform white; outer *primaries* as adult, inner ones and *secondaries* white on basal part of inner webs.

FIRST WINTER.—Like juvenile.

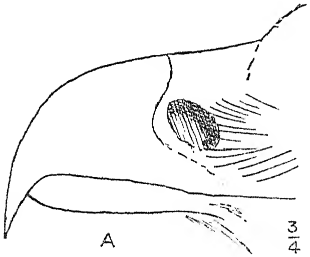
FIRST SUMMER.—The juvenile plumage does not commence to moult apparently until April, is occasionally completed by June, but sometimes not until Oct. Moult complete including wings and tail. When this moult is complete (*i.e.* when bird is one year to eighteen months), *crown* and *nape* much as adult but duller, not so bright rufous-tawny; rest of *body-plumage* including upper tail-coverts much as adult but breast not so rufous and tarsi paler and often whitish; *tail* with shorter black tip and proximal portion very little speckled but more or less washed grey immediately proximal to the black, rest white; inner *primaries* and *secondaries* as juvenile with white bases to inner webs.

SECOND SUMMER.—(When bird is two to two and a half years old) *crown* and rest of *body-plumage* indistinguishable from adult ; *tail* as in second winter but with narrower bands of black at tip and one or two alternate grey and black irregular bands proximal to black, rest white.

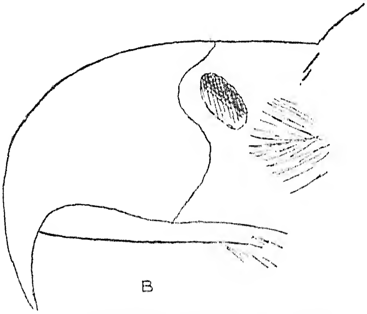
THIRD SUMMER.—(When bird is three to three and a half years old) like adult but extreme base of *tail-feathers* under the coverts white and inner *primaries* and *secondaries* with some white at base but much less than in second summer. At the next moult, *i.e.* when bird is four to four and a half years old, it appears to become adult, but there are not enough moulting specimens available to make quite certain of the sequences.

MEASUREMENTS AND STRUCTURE.—♂ wing 60·5–66 cm. (measured with tape, see vol. i, p. xxxiv), tail 290–325 mm., tarsus 82–110, bill from cere 38–47 (10 measured). ♀ wing 62·5–70·5 cm., bill 40–50 mm. Primaries (1st vestigial one not included) : 1st between 8th and 9th, 3rd to 5th longest, 6th 10–20 mm. shorter, 2nd 35–50 shorter ; 2nd to 6th emarginated on outer webs, 1st to 5th abruptly emarginated and attenuated on inner webs for a little less than distal half. Outer secondaries shorter than 10th visible primary, inner ones becoming longer and longest about equal to 8th, tips sharply rounded. Tail fairly square but outermost feathers shorter than rest, 12 feathers, tips rounded in adult but more pointed in juvenile. Tarsus feathered to base of toes. Claws much compressed, strong and curved. Upper mandible deep, much compressed, sharply curved, projecting much beyond under mandible which has rounded tip and is straight and shallow. Nostrils oblong and very sparsely covered by tips of bristle-like loral feathers.

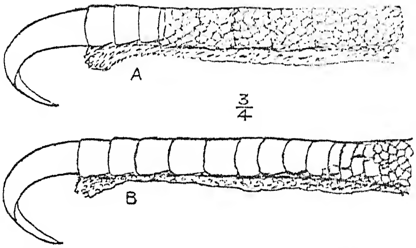
SOFT PARTS.—Bill black, greyish at base ; cere and toes rich yellow, claws black ; iris hazel.
*H.F.W.*



A. Golden Eagle (*Aquila c. chrysaëtus*).



B. Sea-Eagle (*Haliæetus albicilla*).



Middle toes of: A. Golden Eagle. B. Sea-Eagle.

**Characters and allied forms.**—Golden Eagle is distinguished from other British Falconiformes by its large size, square tail, tarsus feathered to toes, and shape of bill (*cf.* White-tailed Eagle). *A. ch. homeyeri* (=*occidentalis*)

(Spain, N. Africa, Sinai) is darker and duller, not so tawny and rufous on crown, nape, and under-parts in adult, but juveniles are similar, also slightly smaller, *A. ch. hodgsoni* (=*daphanea*) (Himalaya, Mongolia, China) is like *A. ch. chrysaëtus* but usually larger; other forms have been separated in Asia and *A. ch. canadensis* in N. America. *H.F.W.*

*PLATE 64.*

## 267. THE SPOTTED EAGLE—Aquila clanga Pall.

Aquila Clanga Pallas, Zoogr. Rosso-Asiat., i, p. 351 (1811—Russia).
*Aquila nævia* (J. F. Gmelin), Yarrell, i, p. 20.
*Aquila maculata* (J. F. Gmelin), Saunders, p. 325; Hand-List (1912), p. 114.
*Aquila clanga* Pall., Pract. Handb., ii, p. 135.

**Habitat.**—In breeding-season frequents chiefly the neighbourhood of marshes, lakes, and rivers in forested districts or more open country, such as steppe, where there are some trees. In winter also generally about water or marshes. *B.W.T.*

**Field-characters and General Habits.**—*A large, dark brown eagle* (*but smaller than Golden*) *unspotted when adult, but with broad whitish or buff spots in immature plumage.* Very like Lesser Spotted Eagle (*Aquila pomarina*), though that species is nearly always decidedly paler. A. Quednau, from field studies supported by examination of a number of specimens, has stated that while upper tail-coverts in present species are always very pale to white, this is never so in Lesser Spotted Eagle, and that they can be instantly separated in the field by this character. This has been accepted in several German works as diagnostic difference, but examination of an extensive series shows that it requires considerable qualification. Upper tail-coverts of *clanga*, particularly young birds, commonly show more or less admixture of white, and some, even adults, show definite white band at base of tail, which is apparently never the case in *pomarina*, but some adults show practically none. Moreover many, if not most, *pomarina* show some whitish at base of tail, and a considerable proportion of examples of the two species could not be separated by any difference in this respect. Thus, though birds showing well-marked white can be accepted as *clanga*, those having a little dingy white or none may be either, and the character must be used with caution. Young birds of present species differ from those of Lesser Spotted Eagle in darker colour, no rusty patch on nape, usually well-marked white or whitish at base of tail, and more conspicuous development of pale spots and streaks on upper-parts. Habits are also rather different, Lesser Spotted Eagle being a more characteristically woodland bird (though hunting over open country), without such pronounced predilection for neighbourhood of water as present species, which is more like Sea-Eagle in habits (Quednau). Habits also help to distinguish from Steppe-Eagle (*Aquila nipalensis orientalis*), from which adults without white at base of tail are probably hardly separable, as this species usually haunts treeless plains or steppe and generally flies low, rarely soaring. Immature Steppe-Eagle is not boldly spotted like young Spotted Eagle, ground colour is a good deal paler, and juvenile has two fairly distinct buffish wing-bars, though these afterwards disappear. Length *c.* 26–29 ins.

Flight as Golden Eagle and has also typical eagle silhouette (see under that species). Differs in this respect, as well as in size, from Buzzard, from which it is also distinguished in flight by tips of wings being bent slightly downwards, not upwards, when gliding or circling (E. Hartert). Perches chiefly on trees. *B.W.T.*

**Voice.**—Note resembles barking of a high-voiced small dog (E. Hartert), a pleasant-sounding "klück, klück," as well as prolonged and barking notes (G. Niethammer); not distinguishable from note of Lesser Spotted Eagle (G. Hoffmann). *B.W.T.*

**Display and Posturing.**—At beginning of breeding-season male and female perform evolutions in the air, rising in wide spirals, often to great height. Male will plunge down, with wings bent, in a long curve towards female soaring below him (L. v. Dobay). *F.C.R.J. & B.W.T.*

**Breeding.**—Little reliable material available with regard to this species owing to confusion with *A. pomarina* and *A. nipalensis.* In E. Europe generally recorded as nesting in old trees (oak, alder, etc.) but in steppe districts in small trees and on bushes. *Nest.*—When undisturbed may use same nest year after year, in which case it becomes very large, but newly built nests are rather small for an eagle, built of branches, twigs, etc., and lined with grasses and leaves decorated with fresh green sprays of alder and fir. *Eggs.*—Generally 1 or 2: 3 reported from W. Asia: greyish-white, coarse in texture, no gloss: frequently unmarked, but at times rather sparingly spotted or blotched with dark brown and some ashy shell-marks. Average of 56 eggs (mostly from Transcaspia), 68·23×54·15. Max.: 74·6×55·6 and 74·4×58. Min.: 64·4×52·8 and 67·2×51·2 mm. (Rey's measurements are erroneous, the average breadth being 3 mm. more than the maximum!) *Breeding-season.*—Latter half April to early May. *Incubation.*—Begins with first egg laid if more than one. Male not known to take part. *Fledging.*—In most cases only one young survives: interval apparently considerable. Period at least 6 weeks (G. Hoffmann), but considerably longer in closely allied *A. pomarina.* One brood. *F.C.R.J.*

**Food.**—Rabbits, water-vole, and Partridge have been recorded from birds killed in Brit. Is. Abroad main food frogs, but also lizards, snakes, and at times fish. Mammals include hare, hamster, rat, mice, *Spermophilus*, mole, and also carrion: occasionally birds, generally wounded or taken by surprise (*Athene, Tringa, Capella,* etc.). *F.C.R.J.*

**Distribution.**—*British Isles.*—Very rare vagrant. *England.*—Cornwall, Dec., 1860; Nov., 1861. Hants, Dec., 1861. Berks, *Oct., 1872. Lancs, 1875. Northumberland, Oct., 1885. Essex, Oct. and Nov., 1891, *April, 1908. Suffolk, *Nov., 1891 (one shot and one seen), Jan., 1892. Hereford, *Nov., 1915. Others reported. *Ireland.*—Two near Youghal (Cork), Jan., 1845. *Scotland.*—One probable Aberdeenshire, Sept., 1861. *H.F.W.*

**Distribution Abroad.**—Palæarctic region, but absent from W. Europe. Breeds from Finland, Baltic states, possibly E. Prussia, Poland, and Russia (north to 63° and east to Perm Govt.) through Siberia to the Amur. In south from Hungary to Yugo-Slavia and locally in Balkan peninsula (but confused with *A. nipalensis orientalis*), Russia to Ekaterinoslav Govt. and

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* Those marked with an asterisk have been critically examined and identified as *A. clanga*, and the other British examples also appear to have been of this species. For details see *Brit. B.*, xiv, pp. 180, 209. *H.F.W.*

Crimea, also Caucasus, possibly Asia Minor, N. Persia, Turkestan, Baluchistan, N.W. India, and east to N. China. Winters in N.E. Africa, Sinai, Iraq, Baluchistan, and India. Casual Sweden, Denmark, Germany, Holland, Belgium, France, Switzerland, Austria, Italy, Sicily, and Algeria. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—*Upper-parts* dark brown when freshly moulted with a strong purple gloss, when worn paler brown; feathers of crown and nape lance-shaped with pale brown edgings; lateral upper tail-coverts usually with some white on tips and edges; feathers of lores bristle-like, black with short buffish tufts at base; *under-parts*, including axillaries and under wing-coverts as upper-parts but slightly paler and with little purple gloss; under tail-coverts often with some white on tips and edges; feathers of tarsus at base of toes often white; all body-feathers with white bases; *tail-feathers* blackish purple-brown slightly tinged dark grey and occasionally with faint indications of dark grey bars; distal portion of *primaries* black, rest and *secondaries* blackish purple-brown, inner webs paler brown, and extreme bases white or whitish; *primary-coverts* and *greater coverts* blackish purple-brown; *median* and *lesser coverts* as rest of upper-parts. This plumage is acquired by complete moult April-December, which is evidently very gradual, as in most examples there is a mixture of old and new feathers, though not to same extent as in Golden Eagle.

NESTLING.—Newly hatched bird, down white (C. Ingram).

JUVENILE.—*Upper-parts* darker purplish-brown than adult; feathers of crown and nape generally with buffish-brown tips; feathers of mantle with central streak of buff-brown at tip varying in size individually; feathers of scapulars, back, and rump with very broad central streaks or spots of buff to whitish-buff; upper tail-coverts with long buffish-white tips; (*under-parts*) chin and throat purplish-brown; feathers of rest of under-parts with dark purplish-brown edges and broad buff to buffish-brown central streaks; under tail-coverts uniform buff; amount of buff on under-parts varies and plumage when worn is much paler; *tail-feathers* as adult but with pale buff tips and more frequently with indistinct bars; *wing-feathers* as adult but inner *primaries* and *secondaries* with pale buff tips and inner webs paler and usually more or less distinctly barred; *primary-coverts* and *greater coverts* as secondaries; *median coverts* as scapulars; *lesser coverts* as mantle.

FIRST WINTER AND SUMMER.—Moult of juvenile plumage does not appear to commence until April and is sometimes not complete until Dec. When this moult is complete (*i.e.* when bird is one year to eighteen months old) plumage is much as juvenile but feathers of *upper-parts* and *wing-coverts* with rather narrower buff centres, feathers of *under-parts* sometimes with narrower buff centres, but sometimes as juvenile; *tail* and *wing-feathers* with shorter buff tips.

SECOND SUMMER.—(When bird is two to two and a half years old.) Pale centred feathers confined to some longer scapulars, some wing-coverts, and lower-breast where pale centres are small, rump, belly, and tibia where they are still usually broad; *tail* and *wing-feathers* with short buff tips.

THIRD SUMMER.—(When bird is three to three and a half years old.) Like adult but with a few feathers on rump and tibia with narrow buff centres at tip and under tail-coverts with varying amount of buff and dark brown. At the next moult, *i.e.* when bird is four to four and a half years old, it appears to become adult, but not enough moulting specimens are available to make quite certain of the sequences.

An individual variety ("*A. fulvescens*") has *upper-parts* orange-buff with tips of feathers whitish and those of mantle with some brown in centre, scapulars with more brown (some have upper-parts mostly brown); *under-parts* uniform salmon-buff, sometimes with dark shaft-streaks to feathers of fore-part of crown, chin, and throat.

MEASUREMENTS AND STRUCTURE.—♂ wing 49–53 cm., tail 220–255 mm., tarsus 100–115, bill from cere 33–39 (12 measured). ♀ wing 50–55 cm., bill 34–40 mm. Primaries (1st vestigial one not included): 4th longest, 5th and 6th as long or 5–15 mm. shorter, 3rd sometimes as long but usually 10–20 shorter, 2nd 25–50 shorter, 7th 40–55 (sometimes 70–75) shorter, 1st between 8th and 9th but sometimes between 7th and 8th; 2nd to 7th emarginated outer webs, 1st to 6th abruptly emarginated and attenuated on inner webs. Nostrils round, otherwise rest of structure as Golden Eagle.

SOFT PARTS.—Bill horn-brown, bluish-grey at base; cere and toes yellow; iris brown. *H.F.W.*

**Characters and allied species.**—No subspecies. *A. pomarina* (N. Germany, Russia, Austria, Balkans, Greece, Caucasus) is like *A. clanga*, but adult is paler, especially on crown, wing-coverts, and under-parts, juvenile and immature birds have considerably smaller pale streaks especially on upper-parts than in *A. clanga* of same age; wing-formula of *A. pomarina* slightly different, 3rd visible primary being frequently as long as 4th and 5th, 6th usually 10–20 mm. shorter, 2nd 15–40 shorter, 7th 65–80 shorter, 1st longer than 8th or occasionally equal to it, 7th not clearly emarginated on outer web; size usually smaller, ♂ wing 45·5–49 cm., tail 210–245 mm., tarsus 90–100, bill 27–33. ♀ wing 46–51 cm., bill 29–34 mm. As measurements and wing-formula of the two species intergrade, care must be taken to examine all the characters. Round shaped nostrils of *A. clanga* and *A. pomarina* distinguish them from other species of *Aquila* likely to be confused. *H.F.W.*

## Genus **BUTEO** Lacépède

BUTEO Lacépède, Tabl. méthod. Ois., p. 4 (1799—Type by tautonymy: *Buteo*, *i.e. Buteo buteo*).

Closely allied to *Aquila*, but weaker birds. Bend of bill sharper and shorter, nostril with straighter upper edge and somewhat longitudinal in horizontal direction. Only four outer visible primaries sharply emarginated, 5th less distinctly. Tarsus bare, in Rough-legged Buzzard feathered, but bare at back. About forty forms in all continents and many islands. Eggs white, usually marked brown, greenish internally.

*PLATE 65.*

### 268. THE ROUGH-LEGGED BUZZARD—Buteo lagopus lagopus (Pontoppidan)

FALCO LAGOPUS Pontoppidan, Danske Atlas, i, p. 616 (1763—Denmark).[1]
*Falco Norvegicus* Latham, Synops., Suppl., i, p. 282 (1787—near London).
*Buteo lagopus* (J. F. Gmelin), Yarrell, i, p. 115; Saunders, p. 323.
*Buteo lagopus lagopus* (Brünn.), Pract. Handb., ii, p. 138.

**Habitat.**—In breeding-season frequents both open tundra or barren fells beyond tree-limit and forested country. Outside breeding-season keeps chiefly to open country, haunting marshes, moors, downs and hill country, heaths, warrens, sand-dunes and the like. *B.W.T.*

**Field-characters and General Habits.**—Soaring flight and broad wings closely resemble those of Common Buzzard, but *tail white or whitish with conspicuous broad dark band at end*; rest of plumage variable, but *generally showing a good deal of white or whitish from below, frequently with well-defined dark breast-shield, head often very light and under-wing largely whitish* with well-defined dark mark at carpal joint and dark tips to primaries. (But see further remarks under Common Buzzard.) Rather longer winged and generally rather larger than Buzzard, but these characteristics usually of little value in field. When settled, apart from coloration, it looks rather heavier bird than Buzzard, with plumage, especially of head, looser and less compact-looking and legs feathered to base of toes. Much more addicted to hovering than Buzzard; wing-action much slower than Kestrel. Length *c.* 20–24 ins.; female averages larger than male.

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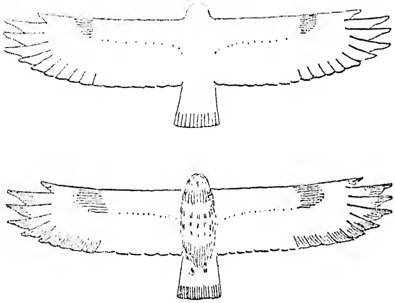
[1] This reference, which is a year previous to that of Brünnich, was pointed out by G. M. Mathews and T. Iredale in *Austral. Avian Record*, 1926.

Flight as Buzzard, apart from hovering propensity; perhaps more inclined to move slowly over ground in a straight line (H. G. Alexander). In breeding-season perches on rocks or ground or on trees according to locality, but in winter generally prefers post or eminence on ground to trees. Breeding birds often come to meet intruder with anxious cries a long way from nest. *B.W.T.*



The Rough-legged Buzzard (*B. lagopus*), two common variations as viewed from below.
(*From a diagrammatic sketch by* H. M. Wallis.)
(See also p. 51.)

**Voice.**—Resembles that of Common Buzzard, but in general louder and lower-pitched; might be described as "miaowing" as opposed to Buzzard's shriller "mewing" note, though as pitch of the common bird's cry varies individually and with state of excitement difference is probably not absolute. Also a distracted, squealing variant at nest. *B.W.T.*

**Display and Posturing.**—In breeding-season pair soar together high in air. A diving performance like that of Common Buzzard has not been recorded, but very probably occurs. *F.C.R.J. & B.W.T.*

**Breeding.**—Usually breeds on ledge in cliff or among rocks and also on high banks, on top of boulders or even on ground in open tundra. In southern part of its range also breeds in trees. *Nest.*—Usually large, built of sticks and twigs where available, heather stalks, mixed with earth, lined dead grasses, and decorated with fresh shoots of pine, *Vaccinium*, or lichen (*Usnea*). *Eggs.*—In ordinary years 3–4, sometimes 2 only, 1 probably from old bird: when food is plentiful, as in lemming years, clutches of 5 and 6 occur, and it is said that 7 have been met with. Colour white, generally freely blotched with reddish-brown or sepia, and with irregular streaks or smears. Some sets very sparsely marked: but few quite white. Average of 133 eggs (93 by E. Rey), 55·03×43·59. Max.: 62×49·5. Min.: 48×41 and 57·8×39·2 mm. *Breeding-season.*—From last fortnight in April onward, but chiefly in May and early June. *Incubation.*—Chiefly at any rate by female, male on guard near by. Begins before completion of clutch, probably with first egg. Period about 31 days (O. Olstad). *Fledging.*—Young fed by female in strict rotation with food brought by male in feet to nest and dropped there. No evidence of female hunting. Period about

41 days (Olstad). Apparently single-brooded, but eggs are said to have been found in August and September, though young could not have been reared. *F.C.R.J.*

**Food.**—In Brit. Is. in winter chiefly rabbits : often also brown rat, occasionally water-vole or field-voles. Stoats, mole, shrew, and small birds, such as Chaffinch, also recorded, and once Pheasant. In breeding-haunts, chiefly lemmings, fell-voles (*Microtus*), also Ptarmigan and Willow-Grouse ; occasionally arctic hare and small birds, including Snow-Bunting, pipits, wagtails, Fieldfare, and Cuckoo. Gosling found in nest once. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Winter-visitor ; Oct., rarely earlier (Aug. 1, 1910, Berks ; 15 (W. E. Clarke) ; Sept., 1881, Suffolk) to March, April, and even May (once June). Occurs most years northern isles and E. coast Scotland and England as far south as Suffolk, and at intervals in considerable numbers, as in winters 1839–40, 1858–9, 1875–6, 1880–1, 1891–2, 1903–4, 1910–11, 1915–16. Also fairly frequent along Pennine Chain, rarer in S.E. England, and only occasional vagrant elsewhere, being especially scarce on W. side Great Britain. *Ireland.*—Over twenty, most frequently in Ulster. *H.F.W.*

**Distribution Abroad.**—Northern part of Holarctic region : partial migrant. Typical race breeds in Europe north to 71° in Norway, N. Sweden (south in Scandinavia to *ca.* 62°), N. Finland, and Russia (Olonetz, Archangel and Vologda Govts. east to Urals). Replaced by allied race, *B. l. pallidus* in Yalmal pen. and Siberia from R. Ob to Kamtschatka : also in arctic Canada by *B. l. sancti-johannis.* Typical form migrates south to middle Europe and Black Sea region : also W. Asia. Casual in N. Spain, France, Switzerland, N. Italy, Yugo-Slavia, Malta, Greece, Asia Minor, Egypt, and N. Persia. *F.C.R.J.*

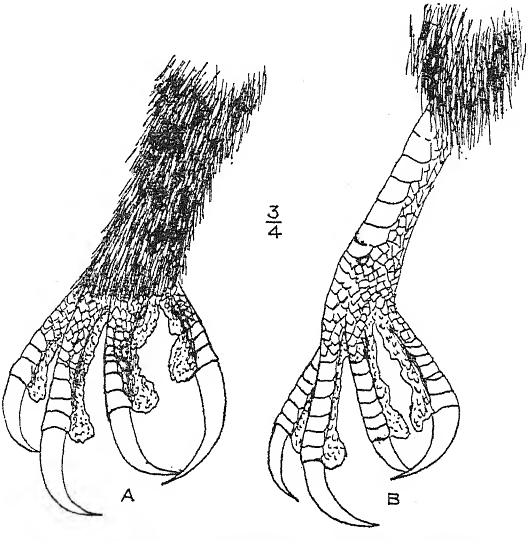
**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) crown and nape white heavily streaked dark brown (sometimes with rusty tinge) ; mantle and scapulars dark to blackish-brown, feathers usually tipped greyish or greyish-brown and with varying amount of white and rufous-buff on edges, concealed part of feathers, especially of scapulars, irregularly barred brown and white ; back and rump uniform dark brown ; shorter upper tail-coverts blackish-brown often with short white tips, longer upper tail-coverts white, with broad penultimate patch and shaft-streak of blackish-brown followed by varying number of blackish-brown irregular bars ; feathers of lores bristle-like, black with short white tufts at base ; (*under-parts*) chin and throat white streaked dark brown, streaks varying in width but usually broad with little white ; breast varying considerably, feathers occasionally having rather wide dark brown shaft-streaks on white or creamy ground, but usually dark brown (often tinged with rust-colour) covers most of distal part of feather and white is confined to concealed basal portion and semicircular marks on edges of feathers, breast thus very dark mottled irregularly with white ; lower-breast and centre of belly white or creamy sparsely marked with varying number of irregular dark brown, spot-like marks or irregular bars ; long feathers on sides of breast covering flanks dark brown often with greyish tips and often broadly barred white and greyish-white but always forming large long blackish patch on each side of breast and belly ; lower flanks, sides of belly, and tibial feathers more or less regularly and closely barred white or buffish-white and dark brown ; tarsus to base of toes dark brown, feathers with whitish tips and often with white edgings and only dark brown centres ; under tail-coverts white with here and there dark brown shaft-streak or spot; axillaries white with dark brown and rust-coloured centres and irregular bars; under wing-coverts dark brown with white bases forming a black patch; *tail-feathers*: basal two-thirds white with occasionally a few black-brown spots, extreme tip greyish-white, followed by broad black-brown penultimate bar, occasionally no other definite bar but usually one more and often two more narrower ones divided by greyish-brown or somewhat rufous-buff (sometimes rufous) or white more or less obscured with brown, in those examples with only one definite blackish bar this is extended 30–40 mm. up the feather with brown often slightly tinged rufous; outer four *primaries* (occasionally 5th) white with black-brown tips to notch on inner webs, outer webs black-brown with a hoary tinge, rest of primaries and *secondaries* with outer webs and distal part of inner webs pale brown barred dark brown, bases and inner edges of inner webs white; *greater* and *median coverts* brown, faintly barred darker brown and with concealed white bases; *lesser coverts* brown edged rufous and on point of wing white. This plumage is acquired by complete moult April to Nov.

NESTLING.—Down like that of Common Buzzard but *down* (A) often slightly paler grey on upper-parts. Front and sides of tarsus with down to base of toes.

JUVENILE.—Feathers of *upper-parts* like adults but with paler brown centres and usually more buff or cream edgings giving a more uniform or less contrasted appearance, concealed portions of feathers of mantle and scapulars more uniform than in adult not being definitely barred; longer upper tail-coverts with paler brown penultimate patch and shaft-streak and not definitely barred; *under-parts* also paler brown and more buff or cream than in adults; upper-breast streaked brown and not mostly brown as is often case in adults; sides of lower-breast more uniform brown and not barred as is usual in adults; feathers of lower flanks and tibia occasionally with some incomplete brown bars but not strongly barred as is usual in adult and usually mostly buff or cream with brown shafts and brown spot of varying size at tip; feathers of tarsus also with less brown than in adult; axillaries cream with brown shaft-streaks and with very little rust-coloured tinge; *tail-feathers*: brown of distal part paler than in adult, often extending much farther up feather, often without bars and when present these are much less distinct and less prominent than in adult; *wing-feathers* and *wing-coverts* paler brown than in adults.

FIRST WINTER AND SUMMER.—Like juvenile until moult which appears to take place from April to Nov. and is complete. After this (*i.e.* when bird is about a year or more old) plumage appears to be same as adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 400–435 mm., tail 200–225, tarsus 65–75, bill from cere 21–23 (12 measured). ♀ wing 420–455. Primaries (1st vestigial one not included): 1st between 7th and 8th, 4th longest, 3rd as long or 5–15 mm. shorter, 5th 5–20 shorter, 6th 55–70 shorter, 2nd 35–50 shorter. Rest



(A) Rough-legged Buzzard (*Buteo l. lagopus*). (B) Common Buzzard (*B. b. buteo*).

of structure as in Common Buzzard, except that tarsus is feathered to base of toes.

SOFT PARTS.—Bill dark horn, bluish at base; cere and toes yellow; iris brown. *H.F.W.*

**Characters and allied forms.**—Larger size, white base of tail and tarsus feathered to toes distinguish Rough-legged from Common Buzzard. *B. l. pallidus* (Siberia, Kamtschatka) has more white on upper-parts and purer white on tail and under-parts, *B. l. sancti-johannis* (N. America) is very like *B. l. lagopus* but slightly smaller, dark markings usually blacker and tail often more barred. *H.F.W.*

*PLATES 65, 65a, and 66.*

## 269. THE COMMON BUZZARD—Buteo buteo buteo (L.)

FALCO BUTEO Linnæus, Syst. Nat., ed. x, i, p. 90 (1758—Europe. Restricted typical locality—Savoy [1]).
*Falco danicus* Latham, Synops., Suppl., i, p. 281 (1787—Shropshire).
*Buteo Spiralis* Forster, Syn. Cat. Brit. B., p. 44 (1817—New name for "Common Buzzard." Bewick, Hist. Brit. B., Fig. p. 57).
*Buteo vulgaris* Leach, Yarrell, i, p. 109; Saunders, p. 321.
*Buteo buteo buteo* (L.), Pract. Handb., ii, p. 141.

**Habitat.**—In Brit. Is. now almost confined in breeding-season to uncultivated hilly and mountainous districts and neighbourhood of rocky coasts; though locally common in well-wooded country, persecution has confined it more markedly than abroad to rather barren and sparsely wooded hill and moorland areas. On Continent, in addition to above types of habitat, occurs in forested country of all types from plains to mountains, where a certain amount of open ground is available; also, as formerly in Brit. Is., commonly in cultivated country with woods; still not very rare in such districts in Britain as vagrant outside breeding-season. *B.W.T.*

**Field-characters and General Habits.**—In field most characteristic feature of Buzzard is its majestic *soaring flight*, as it sweeps round in wide spirals with *broad, rounded wings held straight and almost horizontal and broad slightly rounded tail expanded*. Tips of upward curved primaries are separated like fingers. Head not extended far beyond front border of wings. At rest its size, robust build, dark brown upper-parts and under-parts mottled and barred or streaked with brown and white are good characters. Amount of white on under-parts varies considerably, as does pattern of under-wing as seen in flight. Tips of flight-feathers and to a varying extent the under wing-coverts are usually darker than rest of wing, contrast between dark and light regions being conspicuous in many examples, but in others much less so. In some a dark patch in carpal region is fairly well-defined, but not as pronounced as is usual in Rough-legged Buzzard. In any case only exceptional examples appear as pale below as that species, and lack of white in tail is normally reliable distinction, though existence of such varieties, similar enough to cause confusion, should not be overlooked. At rest un-

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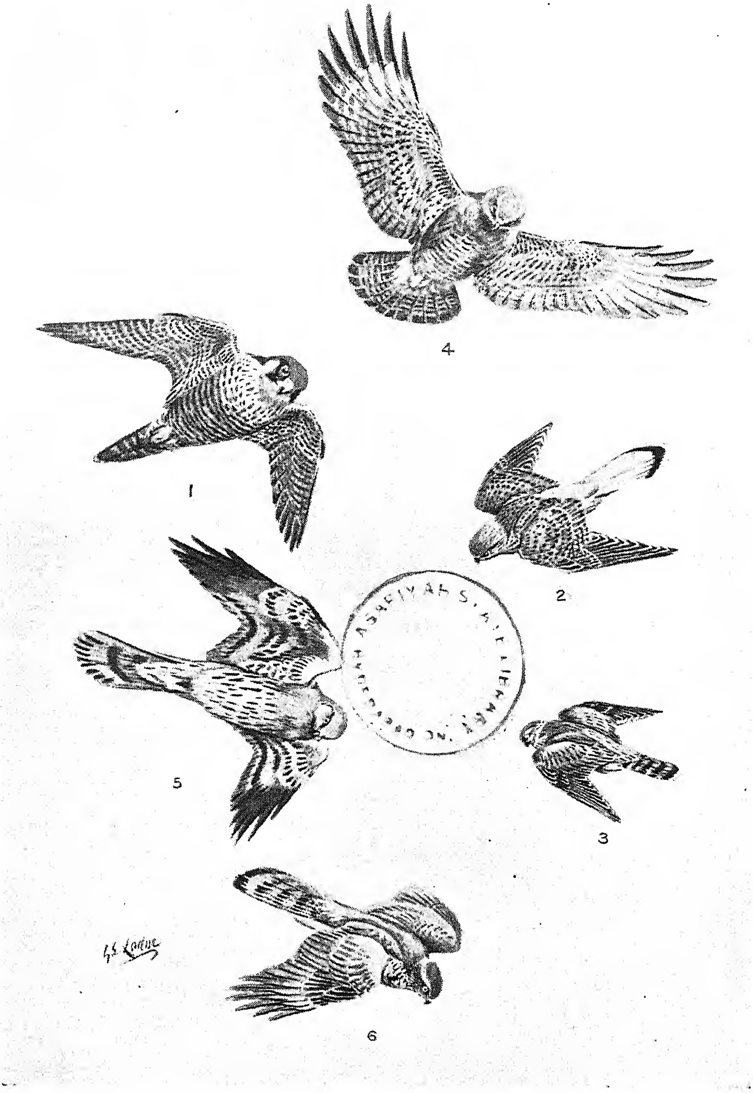
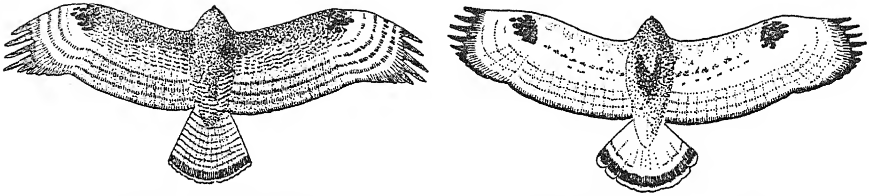
[1] In *A Practical Handbook*, p. 141 (footnote), Hartert stated that Savoy, to which the *B.O.U. List* 1915 restricted the typical locality, was not mentioned by any of the authors quoted by Linnæus, but this is incorrect as Gesner, the first author quoted, stated that he met with the bird in "Sabaudia."



1. Peregrine Falcon. 2, Kestrel. 3, Merlin. 4, Common Buzzard.
5, Montagu's Harrier. 6, Sparrow-Hawk.

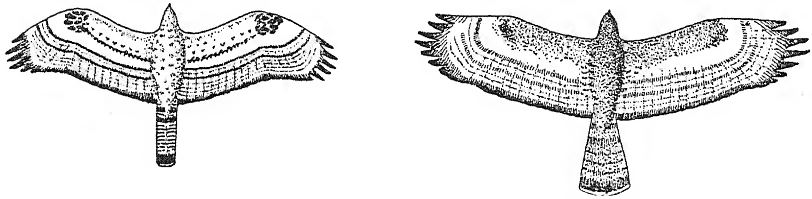
feathered tarsi are further distinction. Length *c.* 20–22 ins.; female averages larger than male.

In soaring flight (see above) will circle round with scarcely a perceptible wing movement for hours on end, often rising to great elevations. In contrast to this, direct flight, especially when flushed from ground or perch, is slow and heavy, with rather laboured flapping, but when well on wing this is varied with gliding when possible, and sometimes it will sweep downwards with half-closed wings at considerable speed. Prey is seized on ground by sudden pounce, as bird hunts comparatively low down over open country, also sometimes by glide from look-out on crag or suitably placed tree, or from lower perch, such as fence or post. Sometimes hovers for brief periods with considerable persistence while hunting, though it has not the lightness and grace of Kestrel. Gait on ground is rather clumsy walk. Scarcely gregarious, but where common it is not unusual to see half-a-dozen or more on wing together and as many as seventeen have been recorded in Devon, though this is exceptional in Brit. Is.; twenty-seven counted in air at once in Germany (E. M. Nicholson). Pellets resemble those of Tawny Owl; average measurement (5 examined) 58 × 26 mm., diameter varying from 23–27 mm. (C. B. Ticehurst). *B.W.T.*



Common Buzzard (*B. buteo*).

Rough-legged Buzzard (*B. lagopus*).



Honey-Buzzard (*P. apivorus*) adult, pale form.

Honey-Buzzard (*P. apivorus*) young.

Buzzards as viewed from below.
(*From diagrammatic sketches by* L. Tinbergen.)

**Voice.**—Ordinary cry a prolonged plaintive, mewing "peeiōō," uttered both on wing and when perched, varying a good deal in pitch both individually and according to the emotional state of the bird. "An uncanny repetition of the syllable 'mah,'" with which pairs will answer one another (J. W.-Bond), a low chuckle or croak of parents bringing food to young, and a shrill yelp of warning to the latter (H. B. Macpherson) are also described. *B.W.T.*

**Display and Posturing.**—In breeding-season pair float in circles round and round each other near nesting-site, always facing one another and the male above, with tails wide spread and wings held stiffly at a steeper angle than in ordinary flight (H. A. Gilbert). Has also a diving display-flight like various other birds-of-prey, in which it repeatedly glides steeply downwards with half-closed wings and shoots upwards again at end of plunge, body being practically vertical at top of curve, when the bird tilts forward and dives again (E. Hesse, H. Siewert, Gilbert). Display occurs as early as Jan., and may also be observed in autumn. E. M. Nicholson records diving display by pair of which one had prey in claws. Aerial play of several birds together is also frequent in autumn and spring; Nicholson describes one of four "tumbling" and soaring birds in April "looping the loop" three times in succession. A different flight display with long sweeping wing strokes like displaying Goshawk has been once recorded on Continent (C. Demandt). Coition generally on edge of nest (G. Niethammer). L. Schuster found no greeting ceremony accompanied nest-relief. *F.C.R.J. & B.W.T.*

**Breeding.**—Unlike falcons, Buzzards build substantial nests placed sometimes on ledge of sea-cliff, or in tree, but in hilly districts frequently on low bluffs or on ground on broken hillsides sheltered by bushes. *Nest.*—Usually bulky, built of sticks and boughs, on moorlands chiefly of heather stalks, while bracken, moss, bark, grass, rushes, and on the coast seaweed, are used as lining material, and the interior is decorated, apparently by female, with freshly plucked sprays of pine, larch, ivy, rowan, birch, juniper, wood-rush (*Luzula*), red and green seaweeds or fern, regularly renewed. Good-sized bones are sometimes embedded in the structure. *Eggs.*—Normally 2, or more commonly 3, occasionally 4, while 5 are rare, and 6 have been recorded. Very old birds may lay 1 only. Colour white, sometimes with bluish tinge, smeared, blotched, or spotted, often sparingly, but sometimes heavily, with red to chocolate-brown markings and at times lilac shell-marks. Generally markings heaviest at big end: at times forming a zone, but also sometimes generally distributed. Some sets unmarked or almost so. Average of 100 British eggs, 56·8×45·44. Max.: 61×45·6 and 59×49. Min.: 52·1×43 and 53·1×42·5 mm. *Breeding-season.*—Usually last fortnight in April or early May: quite exceptionally early in April. *Incubation.*—Begins with first egg usually: eggs are laid at about 3–4 days interval. Both sexes take part, but female takes greater share. Period probably 28 days for each egg, but some give up to 30 days. *Fledging.*—At first male provides food, leaving it near nest, where it is taken over by female and fed to young. After 8–12 days both sexes bring food in feet to nest, sometimes in greater quantities than young can possibly eat. Period, usually 6 weeks, sometimes 7: young fed by parents after fledging. Single-brooded: does not always lay again if first nest is destroyed, but has been known to lay three times in a season. *F.C.R.J.*

**Food.**—Chiefly smaller mammals, especially rabbits, also voles and moles, carrion, dead lambs and placenta of ewe, occasionally birds taken by surprise, and earthworms. Other mammals occasionally recorded include hare, rat, water-vole, mice, shrews, stoat, weasel, and once marten. Birds taken include Crow, Jackdaw, young Magpie and Rook, Greenfinch, Brambling, Yellow Bunting, Sky-Lark, Meadow-Pipit, Great Tit, Fieldfare, Thrushes, Redwing, Blackbird, Nightjar, Little Owl, Wood-Pigeon, young Mallard, Lapwing, Moorhen, Land-Rail, young Shearwater, Pheasant, Partridge, Red Grouse (young as well as old), and domestic chickens. Also snakes (grass-snake and adder), frogs, toads, lizard, slow-worm, bivalve Mollusca: insects:

Coleoptera (dung-beetles): Lepidoptera (larvæ of *Sphingidæ* and *Noctuidæ*); and berries of *Vaccinium*. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Resident (increasing in recent years), breeding commonly in Wales and parts of border, Devonian peninsula, and fairly commonly Lakeland and Pennines, very sparingly in New Forest and occasionally Dorset, also in central, W. and N. Scotland, including I. Hebrides, and also O. Hebrides, where now breeds, though formerly only a very rare straggler there; only exceptionally elsewhere. On E. coast irregular migrant end Aug. and Sept.; occurs as vagrant in non-breeding areas England in every month of year, though mostly between Sept. and Ap. and numerous in some winters (*e.g.* 1870–1, 1880–1, 1931–2); more regular in small numbers in recent years in some parts S.E. England; occurrence at any time in Shetlands doubtful, except Fair Is., where occasional. Eight recoveries of British ringed nestlings indicate that native birds are sedentary. *Ireland.*—Almost exterminated as resident between 1880 and 1890, but pair bred Antrim one year between 1905 and 1915 and also in 1933; otherwise now only autumn to spring vagrant. *H.F.W.*

**Distribution Abroad.**—Palæarctic. Typical race breeds in Europe north to 65° in Norway (recorded to 68°), central Norrland in Sweden, S. W. Finland, limits in Baltic states and Poland not defined, Hungary, and Russia (Volhynia Govt.). In south to S. Spain, France, Italy, Sicily, Yugo-Slavia, Albania, Greece: also W. Asia Minor. Replaced by allied races in Azores, Cape Verde Is., Madeira, Canaries, Corsica and Sardinia: in E. Europe from N. Sweden and N. Finland, Baltic states, Poland, Romania eastward, and by other races in Asia from W. Siberia to Japan. Vagrant south to Mediterranean Is. and coast of N. Africa. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Varying greatly individually. Whole *upper-parts* dark brown, some feathers usually with rusty-brown edges, feathers of back of crown and nape with white bases usually showing and giving streaked appearance, mantle and scapulars with a more or less strong purple gloss, scapulars barred greyish-brown and white on basal portions, upper tail-coverts tipped rufous and usually barred with rufous and at base with white; (*sides of head*) feathers of lores bristle-like, black with short white tufts at base; ear-coverts and sides of neck dark brown more or less streaked pale brown or whitish often with rufous; (*under-parts*) chin and throat as ear-coverts but often with more white and sometimes white with narrow dark brown shaft-streaks; rest of under-parts varying greatly; breast (A) dark brown with varying amount of rufous and white edgings and spots or partial bars (B) white or creamy-white, feathers with wide dark brown stripes; across middle of lower-breast usually a white region with few dark marks; long feathers on sides of breast covering flanks dark brown tipped rufous or buff and with varying amount of spots and bars of rufous and white; lower flanks and belly usually regularly barred white or creamy and dark brown but sometimes white with varying amount of irregular dark brown spots or marks; feathers of tibia and half-way down tarsus in front dark brown tipped and spotted and sometimes barred rufous or buff; under tail-coverts as belly but usually with fewer dark bars or marks; axillaries and under wing-coverts barred dark brown and often rufous and white, under wing-coverts covering base of primaries with blackish tips forming a dark patch; *tail-feathers* with narrow buff tips and broad dark brown subterminal band and rest of feather narrowly barred (bars about 5 mm. wide), dark brown and greyish-brown or dull grey, these paler bands becoming whitish or white on inner edges of inner webs, bases of feathers under coverts white or whitish and not uncommonly tail is more or less strongly tinged with rufous; *primaries* with long purplish-black tips, outer four or five with greyish tinge on outer webs and inner webs white, rest and *secondaries* brown with dark brown bars, edges of inner webs and bases white; *wing-coverts* as mantle. This plumage is acquired by complete moult from April to Oct. or Nov. *N.B.*—An albinistic variation which seems more frequent on Continent than in British Is. has *upper-parts* brown, feathers broadly edged white, and crown with much white; upper tail-coverts often white and tail usually white at base; *under-parts* white or creamy-white with varying number of brown streaks. A melanistic and apparently scarcer variation is almost entirely very dark brown or blackish.

NESTLING.—At first *down* (A) fairly long with silky hair-like tips, covering bird fairly well but rather sparse on under-parts and three-fourths of tarsus bare. Varying pale brownish-grey to pale buffish-grey on upper-parts, round eye usually darker, sides and under-parts white, and usually small white patch at back of crown. Very short tufts of *down* (B) white. Later thickly covered with longer and coarser *down* (C) which replaces *down* (B) (exactly as in Peregrine). *Down* (C) dark greyish-brown to paler buffish-grey, concealing most of *down* (A) when fully grown.

JUVENILE.—Much like adult and when worn difficult to distinguish. (*Upper-parts*) crown more streaked with white or cream; mantle, scapulars, and wing-coverts not so uniform, feathers having edgings of whitish, buff, or rufous-buff; *under-parts* with fewer dark markings than is usual in adults and these usually in form of streaks of varying width and very rarely definite bars on belly where markings are usually in form of irregularly shaped spots; tibial feathers barred; some adults indistinguishable from juveniles on under-parts; *tail* usually not with a distinctly broader subterminal band and only occasionally with rufous tinge.

FIRST WINTER.—Like juvenile.

FIRST SUMMER.—Moult of juvenile plumage appears to take place from April to Nov. In birds a year old before moult feathers are often so worn that pale edgings on upper-parts do not appear different from those in adults. After moult as adults.

MEASUREMENTS AND STRUCTURE.—♂ wing 370–395 mm., tail 190–210, tarsus 70–80, bill from cere 22–24 (12 measured). ♀ wing 380–410. Primaries (1st vestigial one not included): 1st between 7th and 9th, 4th longest, 3rd equal or 5–15 mm. shorter, 5th rarely equal, usually 3–15 shorter, 6th 40–50 shorter, 2nd 30–50 shorter; 2nd to 5th clearly emarginated outer webs, 1st to 4th very abruptly emarginated and attenuated at tips for about one-third of length. Outer secondaries shorter than 10th primary, inner ones becoming longer and longest equalling 8th primary, tips rather sharply rounded. Tail nearly square, very slightly rounded laterally, 12 feathers, tips rounded. Half (occasionally slightly less than half) tarsus feathered on front only, toes short in comparison with *Falco* and claws not so much curved. Bill much compressed, rather slender, upper mandible curved with long slender point projecting beyond under mandible which is short and blunt, no notches on cutting edges as in *Falco*. Nostrils somewhat elliptical and sparsely covered by hair-like tips of feathers of lores.

SOFT PARTS.—Bill dark horn, paler at base; cere, gape, legs and feet yellow (juv. cere greenish): iris dark brown to yellowish-brown (juv. grey); "inside mouth (juv. ♀ Sept.): palate slate-blue on sides shading into pink in centre; sides of under mandible slate-blue, tongue and floor of mouth dusky-pink; margins of gape yellow" (W. H. Dobie). *H.F.W.*

**Characters and allied forms.**—Much rounded wing, weak bill and feet, bristle-like feathers of lores and half-feathered tarsus distinguish Common Buzzard from other British "hawks." For differences of *B. b. vulpinus* see under that form. *B. b. arrigonii* (Corsica, Sardinia) is like *B. b. buteo* but rather smaller, with a slightly finer bill and under-parts are striped and apparently never thickly barred, *B. b. insularum* (Canary Is.) is like *B. b. buteo* but with shorter wing and slightly larger bill, *B. b. harterti* (Madeira), *B. b. rothschildi* (Azores) and *B. b. bannermani* (Cape Verde Is.), *B. b. menetriesi* (Caucasus) and *B. b. burmanicus* (=*japonicus*) have also been described; owing to great individual variation there is considerable intergradation between various forms. *H.F.W.*

*PLATE 65.*

## 270. THE STEPPE-BUZZARD—Buteo buteo vulpinus Gloger

BUTEO VULPINUS Gloger, Abänd. Vög. Klima, p. 141 (1833—"Africa," ex Licht. MS. Berlin Mus., South Africa).
*Buteo desertorum* (Daudin), Yarrell, i, p. 113 (in text); Saunders, p. 322 (in text); B.O.U. List (1915), p. 337.
*Buteo buteo desertorum* (Daud.), Hand-List (1912), p. 116 (in note).
*Buteo buteo vulpinus* Gloger, Pract. Handb., ii, p. 145.

**Breeding.**—Generally recorded as breeding in trees, but much uncertainty as to race in most references. *Nest.*—Resembles that of Common Buzzard. *Eggs.*—Usually 2 or 3, occasionally 4: remarkably small as compared with those of typical race but similar in appearance, spotted or blotched with yellowish- or reddish-brown on white ground, sometimes hardly marked at all. V. Pousar gives average of 230 Finnish eggs as 54·93×43·09 mm.; 21 from Dobrogea average 53·13×42·77. Max.: 57·4×43·5 and 54·5×44·6. Min.: 50·5×42·4 and 50·8×40·1 mm. *Breeding-season.*—From late April to end May in Finland and about mid-April in Romania. *Incubation.*—Chiefly by female: period about 4 weeks. *Fledging.*—Both sexes bring food. Period 40–42 days (I. Hortling). Single-brooded. *F.C.R.J.*

**Food.**—Few detailed records can be assigned to this form, but it is said to feed on small mammals (rats, field-mice, etc.), young birds, snakes, lizards, frogs, worms, and largely insects, especially Orthoptera (grasshoppers) and Coleoptera (dung-beetles, etc.). *F.C.R.J.*

**Distribution.**—*England.*—One Everley, Wilts, Sept., 1864 (J. Gould, *Birds Great Britain*, i, p. xxx, skin preserved in Brit. Mus.). [Male Bywell, nr. Newcastle, 1830, stated to be of this form (J. H. Gurney, *Ibis*, 1878, p. 118), is *B. b. buteo* (see *Brit. B.*, xiv, p. 183), while another male Tynemouth (Northumberland) also stated to be of this form (*loc. cit.*) is not available for examination.] *H.F.W.*

**Distribution Abroad.**—Breeds in N. Sweden, N. and E. Finland, Baltic states, Poland, Romania, Bulgaria, and Turkey on west, but limits imperfectly defined. In Russia north to Archangel and east to Perm Govt.: also W. Siberia, Semipalatinsk, Altai, and Turkestan: south to Crimea. Winters in Africa from Nile to S. Africa, Arabia and India, through central Europe and S.W. Asia. Recorded from Iberian peninsula, France, Sardinia, etc. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Like Common Buzzard and *upper-parts* sometimes indistinguishable, but usually feathers edged more rufous and often broadly edged rufous and crown and nape sometimes more rufous than brown; *under-parts* varying greatly, usually with markings more rufous than in Common Buzzard, especially tibial feathers, and sometimes whole under-parts almost uniform rufous with some whitish streaks on chin and throat and some dark shaft-lines on rest of under-parts; axillaries and under wing-coverts also more rufous but dark patch at base of primaries blackish in most rufous examples; *tail-feathers* usually more rufous and with bars on proximal half absent or broken and sometimes absent altogether on central pair. (Occasional examples are almost black.)

JUVENILE.—*Upper-parts* with feathers usually more broadly edged with rufous than in any juvenile Common Buzzard; *under-parts* deeper cream or buff and dark markings rufous or tinged rufous especially on tibia; *tail* usually tinged rufous and without broad subterminal band.

FIRST SUMMER.—Moult apparently as in Common Buzzard, after which becomes like adult; new feathers of *tail* usually more rufous than in juvenile and with broad subterminal band. *N.B.*—Moulting adults show that tail does not become more rufous or less barred after first moult.

MEASUREMENTS.—♂ wing 350–385 mm., tail 175–195, tarsus 65–75, bill from cere 20–23 (15 measured). ♀ wing 350–390. Thus smaller than in Common Buzzard but measurements overlapping. *H.F.W.*

[NOTE.—The occurrence of the American buzzards, Red-shouldered Hawk, *Buteo lineatus lineatus* (Gm.) in Scotland (Yarrell, i, p. 113; Saunders, p. 322) and Red-tailed Hawk, *Buteo borealis borealis* (Gm.) in Notts (Saunders, p. 322) has been recorded.]

## Genus **CIRCUS** Lacépède

CIRCUS Lacépède, Tabl. méthod. Ois., p. 4 (1799—Type by subsequent designation of Lesson 1828: *C. æruginosus*).

Plumage soft, feathers of face narrow, forming a more or less incomplete ruff. Bill short and strongly curved, nostrils longitudinal, thinly covered by loral bristles which are directed upwards. Tarsus long, thin, claws very strongly curved and very sharp. Wings long and pointed, secondaries very much shorter than primaries. Tail long. Almost cosmopolitan. Eggs white (occasionally marked brown), deep green internally.

*PLATE 67.*

## 271. THE MARSH-HARRIER—Circus æruginosus æruginosus (L.)

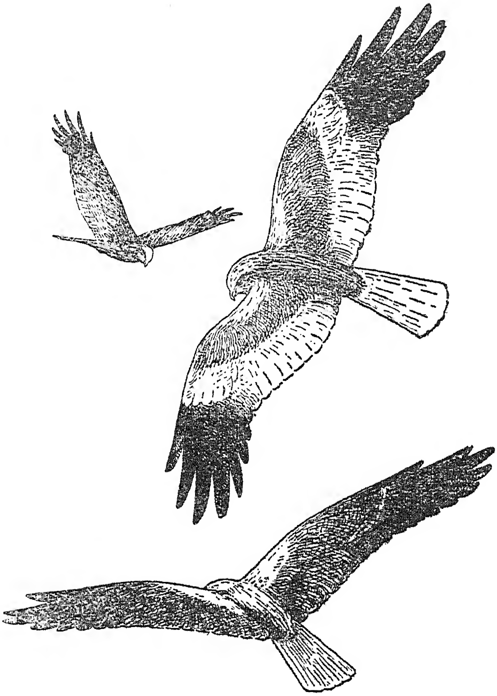
FALCO ÆRUGINOSUS Linnæus, Syst. Nat., ed. x, i, p. 91 (1758—Europe. Restricted typical locality: Sweden).
*Circus Palustris* Forster, Syn. Cat. Brit. B., pp. 1, 44 (1817—New name for *Falco æruginosus* and the " Moor Buzzard " of Bewick, Hist. Brit. B., p. 61).
*Circus æruginosus* (Linnæus), Yarrell, i, p. 127; Saunders, p. 315.
*Circus æruginosus æruginosus* (L.), Pract. Handb., ii, p. 146.

**Habitat.**—Frequents extensive reed-beds, marshes, and reedy swamps at all seasons, hunting at times over neighbouring grasslands and open country, but seldom (except as passage migrant or vagrant) far from typical haunts, as above. *B.W.T.*

**Field-characters and General Habits.**—Harriers are large, long-winged, long-tailed, and long-legged hawks frequenting open country. Their flight is characteristic, often only a few feet from ground or above tops of reeds or crops, several leisurely wing-beats followed by glide on half-raised wings; but at times, especially in breeding-season, they will rise in wide circles to considerable heights. When hunting they quarter the ground with much regularity and seize their prey by a sudden pounce.

Marsh-Harrier is *largest European species, with broader, more rounded wings, slower flight and heavier build* than the others, and is normally confined to marshy localities. *Plumage predominantly dark, rusty-brown,* much the commonest phase (female and immature males) having *lighter, buffish shoulders and head,* though plumage varies much in detail. Tail not barred. Juveniles and first winter birds are uniform very dark brown with creamy-yellow cap and throat (occasionally whole head dark brown). *Adult male has tail, secondaries, and some coverts ash-grey,* so that in flight wing shows broad oblique band of grey contrasted with black primaries, and there may be a little white at base of tail in old birds: this plumage looks very different in field from the others. Old females may show some grey in tail. Length *c.* 19–22 ins.; female not appreciably larger than male.

Usually seen hunting over marshes and reed-beds, into which it drops occasionally in a rather clumsy fashion after some unwary bird or humbler quarry, and will wait on sportsmen to pick up wounded or dead birds. Settles on ground or on posts, bushes, etc., sometimes on low branch of dead or fallen tree in open swamp, but never normally at any height in trees. Gait a walk. Roosts on ground amongst reeds or swamp vegetation. Not gregarious. Pellets (two measured) 31×15 mm. (C. B. Ticehurst). *B.W.T.*



Marsh-Harrier (*C. æ. æruginosus*) adult male and female and immature (in distance).
(*From diagrammatic sketches by* B. W. Tucker.)

**Voice.**—Spring note of male a plaintive shrill " kweeōō," " kooă," " kooāçk," " kooih," " kwih," etc., somewhat variable in sound, at times not unlike Lapwing; uttered once or at most twice, not in series. Note of female a plaintive thin, more whistling note " beeyüh," " bee," etc., often several times repeated (E. Hesse). F.C.R.J. describes alarm-note of female as a high-pitched " chink-*a,* chink-*a,*" etc., of male as " chuck-a-ra, chuck-a-ra," and also mentions a whining note of female when uneasy on nest. Generally silent outside breeding-season, but I have heard a rather shrill, feeble " kyik " from birds apparently playing together in autumn. *B.W.T.*

**Display and Posturing.**—In breeding-season male performs high, soaring flights and remarkable evolutions in the air, of which spectacular dives and somersaults are the dominant features, though details vary. It will ascend to a great height and plunge down with closed or partly closed wings for as much as 200 ft. with an upward sweep at the end or, with only small loss of elevation, will completely " loop the loop " or, tilting over sideways with partly closed wings, revolve round its own axis as it drops for some distance, ascend again and repeat the performance, continuing sometimes for as much as half-an-hour. The display is nearly always accompanied by characteristic note (see " Voice "). A good many observers, including the writers, have witnessed these displays, but see, especially, E. Hesse, *Journ. f. Orn.*, 1912, p. 483. A. Buxton describes diving performance by male while all the time carrying prey for female, which would join him in the air. They would then circle together and male would invariably alight on " cock's nest," where female would join him, and both remain for a minute or two, after which male would fly up carrying the food, which he deposited on heap of dead sedge, where female rejoined him and took it. This was continued with absolute regularity until last egg was laid, and then ceased, so that " cock's nest " was probably used for coition. *F.C.R.J. & B.W.T.*

**Breeding.**—Usually in marshes and fens, where reeds and rank vegetation growing in water provide covert, and often surrounded by water several feet deep, but the S. Spanish race has been known to breed in a recently reclaimed cornfield (H.F.W.). *Nest.*—In some cases very bulky, especially when among high reeds, built of dead reed-stems or roots, sedge and water plants, with sometimes thorns or branches of alder and sallow worked in: lined with finer marsh grasses, considerably larger than that of Hen- and Montagu's Harriers. Built by hen, but male also makes a supplementary nest and at times carries material to nest after incubation has begun. *Eggs.*—Usually 4–5, 6 scarce, 3 occasional, and 7 recorded about 3 or 4 times, 8 once; bluish-white, without gloss, often stained but rarely if ever definitely marked. Average of 130 eggs from middle Europe (62 by Rey), 50×38·75. Max.: 55×41·3 and 54·5×42·5. Min.: 47×37·9 and 48×35 mm. *Breeding-season.*—Laying begins last fortnight of April onward in Norfolk and Holland to late May, but late June nests probably second layings. *Incubation.*—Begins with first or second egg, but interval between eggs may be from 2 days to 3, or even 4–5 occasionally. By female largely, sometimes entirely, but there are many cases where males have been flushed from eggs, so evidently he must take a variable share (J. Vincent). Period: estimates vary from 33 to 38 days, but apparently about 36 days for each egg. *Fledging.*—Normally male provides food for family, bringing it in feet to nest or vicinity, female generally rising in air to take it and feeding young, but sometimes it is dropped by male. Some males never visit the nest: others occasionally do so and have been photographed there. Young remain in or near nest about 35 to 40 days, but are not fully fledged till about 3 weeks later, being fed by their parents by dropping prey in air, even when they can fly well. Single-brooded (*cf.* H. Weis, *Life of the Harrier*). *F.C.R.J.*

**Food.**—British records include Amphibia, Reptilia, smaller mammals and birds taken unawares by short stoop: also eggs and nestlings of marsh-breeding birds. Frogs (very commonly), snakes; mammals (leverets, brown rat, water-vole, etc.); birds (chiefly Moorhens and Coot, once Water-Rail: young Pheasants, Garganey, Shoveler, and Red-legged Partridge (J. Vincent) also taken, and eggs of Moorhen, Coot, etc., as well as wounded birds (ducks, etc.)). Continental records include in addition: mammals, hamster, rabbits, *Spermophilus*, voles, and mice: birds (bunting, Song-Thrush, larks, grebe, Jack Snipe, young of Magpie, Black-headed Gull, Glossy Ibis, Mallard and Black-throated Diver, eggs of Bittern and in case of *C. æ. harterti*, Purple Gallinule): also toads and frequently fish. *F.C.R.J.*

**Distribution.**—*England and Wales.*—A few pairs breed Norfolk (1 pair 1915, 1919, 1921, 1 to 4 pairs 1927 to 1936, in 1937 4 pairs seen, but 4 old birds "disappeared" and no young reared, in 1938 2 pairs but only 1 young hatched); has probably also bred Suffolk recently. Breeding birds appear to be summer-visitors, though one wintering Norfolk 1936–7 may have been bred there. One ringed as nestling Norfolk was reported in Marocco in April two years later. Elsewhere now only rare vagrant occurring in every month of year, but chiefly spring and autumn. *Scotland.*—Rare vagrant. Has occurred several times in Solway area and E. Lothian, but elsewhere under ten recorded. *Ireland.*—Widely distributed before 1840, gradually became reduced to a few pairs in midland and west, but not known to have bred for last 20 years. Single birds occur occasionally. *H.F.W.*

**Distribution Abroad.**—A Palæarctic summer-resident; resident in south. Typical race breeds in Europe north to the Baltic and middle Sweden, Finland, and Russia (Olonetz and Kostroma Govts. and 58° in Urals). Also W. Siberia, Semipalatinsk, Altai, and Tarbagatai. In south to Portugal, S. France (not Switzerland), Italy, Balkan peninsula, Crimea ? and Caucasus: also Balearic Is., Corsica, Sardinia, Sicily, ? Egypt. Also Palestine, Syria, Asia Minor, Iraq, and Persia to Turkestan. Replaced by an allied race in S. Spain, Marocco, Algeria, etc. On passage Mediterranean region, some wintering in tropical Africa, India, and Malay peninsula. Accidental in Norway, Færoes, Canaries, etc. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) whole crown and nape cream-buff to rufous-buff streaked varying width dark brown to blackish; mantle, scapulars, and back dark brown to blackish, feathers with varying amount of narrow rufous edging; upper tail-coverts tipped rufous and brown, varying and with whitish or ashy-grey bases; (*sides of head*) feathers of lores with black bristle-like tips and creamy tufts at base; ear-coverts pale buff marked varying amount of brown and rufous; feathers below ear-coverts streaked dark brown with creamy edgings, short and slightly curled forming an ill-defined *ruff*; (*under-parts*) chin creamy-buff finely streaked dark brown; throat and breast buff to rufous-buff with brown streaks varying greatly in width; rest of under-parts chestnut, feathers with varying amount of rufous-buff to buff edges; axillaries rufous-buff with brown shaft-streaks varying in width; under wing-coverts same but usually paler (often creamy-white) and less streaked; *tail-feathers* dull silver-grey with brownish tinge (in tail and wing-feathers rami are brown with ashy-white distal radii which are mostly lost in worn plumage, making feathers browner), inner edges of inner webs of all except central pair whitish to rufous-buff, tips whitish; outer five visible *primaries* with distal halves black but outer webs and tips more or less tinged grey, proximal half of inner webs white to buffish-white slightly marked dark brown, rest of *primaries* becoming more silvery-grey on outer webs and distal portion of inner webs with a few dark spots; *secondaries* still more silvery-grey except three or four innermost which are brown; *primary-coverts* silvery-grey; outer *greater coverts* same but inner brown to dark brown; *median coverts* dark brown with varying amount of rufous on tips and edges, outer feathers usually with some silvery-grey; *lesser coverts* and *innermost median* buff to pale buff, streaked dark brown much as crown and forming a buff line down inner edge of wing. *N.B.*—In worn plumage buff becomes whiter but much of pale edging on *upper-parts* is worn off, *tail* and *wings* become browner. This plumage is acquired by complete moult, but there seems no regular period as specimens in moult in every month have been examined.

ADULT FEMALE. WINTER AND SUMMER.—Like adult male but (*upper-parts*) crown and nape usually more uniform and less streaked (rarely broadly streaked) ; feathers of centre of mantle broadly edged cream to rufous-buff ; (*under-parts*) chin and throat creamy-buff often without dark brown streaks ; lower throat and breast dark chestnut-brown, feathers broadly edged cream-buff to rufous-buff and often a patch on upper-breast with very little dark brown (not streaked as in adult male) ; rest of under-parts uniform dark chestnut-brown ; axillaries and under wing-coverts darker than in adult male ; *tail-feathers* dark brown with varying amount of silver-grey, occasionally almost as much as in adult male on central pair and outer webs of rest, but usually less and often scarcely noticeable especially in worn plumage, inner webs (except of central pair) with varying amount of rufous markings ; *wing-feathers* blackish chocolate-brown with much less white at base than in adult male, and never with more than a wash of silver-grey on outer webs, and usually with only a slight greyish tinge, disappearing in worn plumage ; *primary-coverts* as wing-feathers ; rest of *wing-coverts* as adult male, but without any silver-grey.

NESTLING.—At first *down* (A) short, rather scanty, with bare patches on breast and sides of belly, white on crown, throat, breast, and belly ; pinkish-buff round base of neck, mantle, and upper surface of wings ; buffish down middle of back and rump and round eyes. Bill : upper mandible black, lower, cere, and gape pink-flesh, feet pinkish (bird one day old). Older birds in down not available for examination.

JUVENILE. MALE AND FEMALE.—Much as adult female but (*upper-parts*) crown and nape usually with very fine streaks or none, but sometimes crown dark brown and nape cream or buff streaked dark brown ; ear-coverts uniform dark brown ; whole of *under-parts* sometimes uniform dark to chocolate-brown but usually chin cream to buff and some feathers of breast edged same but usually less buff on breast than in adult female ; *tail-feathers* dark brown with buff tips, occasionally with a little rufous on inner webs of outer pair ; *wing-feathers* same with a little whitish at base ; *wing-coverts* dark brown with buff tips, *lesser coverts* often as rest but sometimes with buff edgings, but not forming a distinct buff line down inner edge of wing as in adult male and female.

FIRST WINTER.—As juvenile.

FIRST SUMMER. MALE AND FEMALE.—Body-plumage commences to moult from Jan.-Mar., but wings and tail do not moult before May. After this moult both sexes are much like adult female but *crown* usually more streaked, *tail* and *wings* of both sexes without any silver-grey but tails of males with slight greyish tinge and outer feathers usually with more rufous which sometimes takes form of bars. After this plumage I have been unable to trace sequence with certainty in females.

SECOND SUMMER. MALE.—*Crown, nape*, and *under-parts* streaked and as adult male ; *tail-feathers* silver-grey but more tinged brown than in adult and inner webs rufous with brown bars usually extending across outer webs of outer feathers and a broad brown penultimate band ; *wing-feathers* and *wing-coverts* with much less silver-grey than in adult male. After next moult plumage appears to become as adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 375–415 mm., tail 210–230, tarsus 85–90, bill from cere 21–23·5 (12 measured). ♀ wing 390–420. Primaries (1st vestigial one not included) : 1st between 6th and 7th, 3rd and 4th longest (4th occasionally 5 mm. shorter), 2nd 10–25 shorter, 5th 15–30 shorter, 6th 70–90 shorter ; 2nd to 5th emarginated on outer and 1st to 4th on inner webs. Outer secondaries shorter than 10th primary, inner ones about as long as 7th and 8th, tips rounded. Tail rounded laterally, 12 feathers, tips rounded. About a third of tarsus feathered on front. Toes long and slender, 3rd and 4th connected at base by web, claws long, slender, and tapering to very sharp point. Bill somewhat short, fairly broad at base, compressed at tip of upper mandible which is curved and projects in a sharp point over lower mandible, which is flat and with rounded tip, cutting edge of upper mandible with curved projection. Nostrils oblong, thinly covered with bristle-like feathers of lores. On each side of back from insertion of wing to rump narrow patch of "powder" down, with long, closely set and very fine barbs matted together, friable and greasy to touch, much as in herons but longer, less matted, and not lying so close to skin.

SOFT PARTS.—Bill black, bluish-grey at base; cere and legs and feet yellow; claws dark slate; iris yellow-brown. *H.F.W.*

**Characters and allied forms.**—Dark colour and creamy head of young males and females, large size, and absence of white on rump distinguish Marsh- from other British harriers. *C. æ. harterti* (N. Africa) in adult male is rather whiter less creamy on crown, blacker on mantle, whiter on lesser wing-coverts. *H.F.W.*

*PLATES 66 and 68.*

## 272. MONTAGU'S HARRIER—Circus pygargus (L.)

FALCO PYGARGUS Linnæus, Syst. Nat., ed. x, i, p. 89 (1758—Europe. Ex Albin. Typical locality: England).

*Falco cineraceus* Montagu, Orn. Dict. under F., fol. K2 (1802—Wiltshire). *Falco cinerareus* Montagu, Trans. Linn. Soc. London, ix, p. 188 (1808—Evidently slip for *cineraceus*).

*Circus montagui* Vieillot, Nouv. Dict. d'Hist. Nat. (Nouv. Ed.), xxxi, p. 411 (1819—New name for Montagu's *Falco cineraceus*).

*Circus cineraceus* (Montagu), Yarrell, i, p. 138; Saunders, p. 319.

*Circus pygargus* (L.), Pract. Handb., ii, p. 150.

**Habitat.**—In breeding-season, equally frequents reedy and sedgy marshes and fens or dry moors, heaths, rough commons, sand-dunes, etc., often where such ground is interspersed with young conifer plantations. On Continent also sometimes cornfields and cultivated plains. In winter-quarters frequents open grasslands and savanna country. *B.W.T.*

**Field-characters and General Habits.**—European harriers other than Marsh-Harrier are all distinctly smaller, more lightly built and narrower-winged than that species, birds of lighter and more buoyant flight, and adult males have more or less uniform grey upper-parts and black wing-tips.

Male of Montagu's Harrier differs from Hen-Harrier in *dark bar across secondaries* (showing also on underside of wing) and *grey or sometimes greyish-white rump*—never a broad area of pure white as in Hen-Harrier. At close quarters *rufous streaks on flanks* can be seen and grey is rather darker. Female resembles that of Hen-Harrier; white at base of tail is generally narrower and less pure, but this difference is not clear-cut enough to be really diagnostic. Montagu's Harrier is also more slightly built, with rather longer, narrower wings and longer tail. This distinction may be quite noticeable if the two species are seen together, but otherwise is too slight to be of value to any but observers having considerable familiarity with both, and even for these identification of solitary "ring-tails" by build alone is not to be commended. Juvenile differs from adult female and from any plumage of Hen-Harrier in rufous-buff under-parts without streaks. Length *c.* 15½–18 ins.; female not appreciably larger than male.

Flight graceful and buoyant with typical harrier action, several wing-beats and then a glide with wings inclined upwards at a small angle to the horizontal. Settles on ground or on stump or post, occasionally on bush or young conifer. Gait and general habits as Hen-Harrier. In S. Europe a number of pairs may breed close together, and great numbers have been described as assembling after breeding-season to roost in company, amongst grass, standing corn, reeds, or similar cover. Even in north of range in localities where species is common, as in Denmark, where usual roosting-place is amongst heather in young conifer plantations, a number of families may assemble to roost together (H. Weis). Same observer remarks tendency of adult males to separate from females and young; he has seen as many as ten old males arrive together at usual place of assembly, and they may at times roost quite separately from the rest. *B.W.T.*

**Voice.**—Chattering note in neighbourhood of nest is softer and much less penetrating, but higher-pitched than that of Hen-Harrier, like "yick-yick-yick - - -" instead of "ke-ke-ke-ke" (L. Schuster). E. Hesse considered display note, which is little if at all different from this, not distinguishable from that of Hen-Harrier, but in view of Schuster's conclusion, this seems to require further attention.[1] Food-call less hard and harsh, "dyōōkōōh" of male bringing food to female doubtfully distinguishable (Schuster). *B.W.T.*

**Display and Posturing.**—Display scarcely differs from Hen-Harrier's, but tends to be less strenuous, the ascents and descents shorter and less steep and often omitting the somersaults and acrobatics. Sometimes male will dive at female, which turns momentarily on back to ward him off, and feet may even touch for a moment. Pair will also soar in wide circles, the male above, and at beginning of season several males will display before one female (E. Hesse, L. Studinka). Dive described as accompanied by snipe-like humming or whizzing sound (G. Niethammer). Coition takes place on ground, where male joins female and balances with wings for a few moments on her back (Studinka); usually in immediate vicinity of nest (E. Knorr). *F.C.R.J. & B.W.T.*

**Breeding.**—Where numerous shows strong tendency to sociability in breeding, many pairs nesting together in one marsh, but in England not more than a few pairs have bred within range of one another. *Nest.*—Generally in rank marsh vegetation, but also on heaths with gorse bushes, heather, bramble thickets, etc., as covert. Abroad also breeds in cornfields and growing crops. Nest is composed of rushes, sedge, or coarse grasses lined finer material; on ground in a small open trampled space with high vegetation all round. Sometimes both sexes take part in building, but female arranges material and in most cases does practically all the work. *Eggs.*—Usually 4–5, sometimes 3, 6 scarce, but 8 and even 10 have been recorded from Norfolk, and it is said that the eggs were laid at normal intervals (J. Vincent), though it seems more likely that two females laid together. Shape rounded or sometimes elongated ovate, pale bluish-white or white, generally unmarked, but exceptionally with pale (or even dark) rusty-brown spots and streaks. Internally they show green. Average of 100 eggs, 41·54×32·67. Max.: 46·5×32·5 and 42·5×37·5. Min.: 37×30·2 and 41·5×29·6 mm. Average weight 2 grams (1·76 to 3·8 gr., E. Rey). *Breeding-*

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[1] The conclusions of both observers are based on extensive experience.

*season.*—In England about last 10 days of May and early June, but 2 or 3 weeks earlier in Mediterranean region. *Incubation.*—Eggs laid at intervals of 36 hours to 3 days (2–3 days): female sits from first egg and normally incubates alone, leaving nest to take food by pass in air from male, either from foot to foot or dropped by male and caught by female. Exceptionally cock has been flushed from eggs (G. A. Garceau and D. N.-Thompson). Period 28–29 days for each egg (27 and 30 also recorded). *Fledging.*—Up to last stage all food provided by male in feet: hen remaining at nest till called off, when the pass is given and she returns to nest, feeding each young in turn from bill and eating remains of food. During incubation food brought usually 5–6 times in day: in later stages 7–10 times between 4.15 a.m. and 8.5 p.m. (Vincent). Male may exceptionally visit nest. In last stage young separate and hide and are fed separately, both sexes hunting. Period 32 to 35 days. Single-brooded. (J. Vincent and L. Studinka, MSS., H. Weis, *Life of the Harrier*, and G. Corlett, *Brit. B.*, xxiv, etc.) *F.C.R.J.*

**Food.**—In Brit. Is. chiefly Amphibia, reptiles, birds' eggs, and small birds or mammals taken unawares. Frogs, toads, snakes (especially vipers), lizards, rat, short-tailed field-vole, once hare: birds, chiefly Meadow- and Tree-Pipits, Sky-Larks, Stonechat, and Yellow Bunting; Redwing, Song-Thrush, young Golden Plover, young Grouse (once), and chicken: nestlings and eggs of ground-building birds: occasionally young Pheasants and Partridges. Also earthworms and larger insects, chiefly Coleoptera. *F.C.R.J.*

**Distribution.**—*England and Wales.*—Summer-resident; second week April to end Oct. (late dates Nov. 17, 1922, Gloucester; 18, 1909, Kent). Nests annually Norfolk (in 1935 most "disappeared," none bred 1936, two pairs 1937, one pair 1938), fairly regularly in Suffolk, Cambs, Hants, Devon, Cornwall and S. Wales, and occasionally elsewhere, as in Dorset, Wilts, Is. of Wight, Sussex, Surrey, Worcester, Yorks and Merioneth, and possibly Somerset, Notts, and Northumberland. Vagrant elsewhere. Three Norfolk ringed nestlings recovered Suffolk (2) and central France Aug. and Sept. same year; three others returned next year, or two years later, to Norfolk (2) and Northampton, while one ringed Holland reached Suffolk following summer. *Scotland.*—Rare vagrant; about seven in southern half of mainland, one of which (June 15, 1881) may possibly have nested in Solway area. *Ireland.*—Rare vagrant. One Queen's co., two co. Dublin, seven co. Wicklow, three co. Wexford, one Kerry reported obtained; two seen on migration co. Dublin and pair with young bird repeatedly seen Wicklow Sept. or Oct. about 1919, where probably has bred. *H.F.W.*

**Distribution Abroad.**—Summer-resident and resident in W. Palæarctic region. In Europe north to S. Sweden (Nerike), Baltic states, and Russia (Kostroma, Ufa and Perm Govts.): also Kirghiz Steppes, Turkestan, Semipalatinsk, Altai, Tarbagatai, and S.W. Siberia. In south to Mediterranean and Black Seas, but not in Switzerland, S. Italy, Albania, Greece, or Mediterranean Is., but breeds in Marocco locally, also N. Persia, Transcaspia, and Aralo-Caspian region. Some migrate through Mediterranean region to tropical and S. Africa: also to S.W. Asia. Accidental in S. Norway and Canaries. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—Whole *upper-parts* ashy-grey usually and especially when worn brownish or mixed dark brown, radii only of feathers being ashy-grey and rami dark brown; upper tail-coverts with narrow white tips and white bases barred or spotted with dark grey and basally with rufous; (*sides of head*) feathers of lores with black bristle-like tips and whitish tufts at base; round eye hoary (only very slight indication of facial ruff); (*under-parts*) ear-coverts, sides of neck, chin, throat, and breast ashy-grey as upper-parts but seldom becoming brown in worn plumage; rest of under-parts white more or less washed grey (varying somewhat individually), feathers streaked pale chestnut, varying in width; axillaries white barred chestnut, under wing-coverts white streaked varying amount chestnut and sometimes pure white, those covering primaries widely and irregularly barred greyish-black; *tail-feathers* narrowly tipped white, central pairs and outer webs of rest ashy-grey wearing to brown as upper-parts, inner webs of inner pairs brownish-grey more or less mixed with white on basal portion and widely barred dark brown to brown, outer pairs white and barred rufous-brown to pale chestnut; outer six visible *primaries* black with grey tips (lost when worn), 7th with considerably more grey on distal portion, 8th to 10th ashy-grey with inner webs with varying amount of white broadly barred brown-black; *secondaries* as 8th to 10th primaries but brown-black bars crossing both webs, innermost secondaries as rest of upper-parts; *primary-coverts* pale ashy-grey; rest of *wing-coverts* rather darker as rest of upper-parts. This plumage is acquired by complete moult which appears to take place at no regular period as individuals in moult taken in every month have been examined.

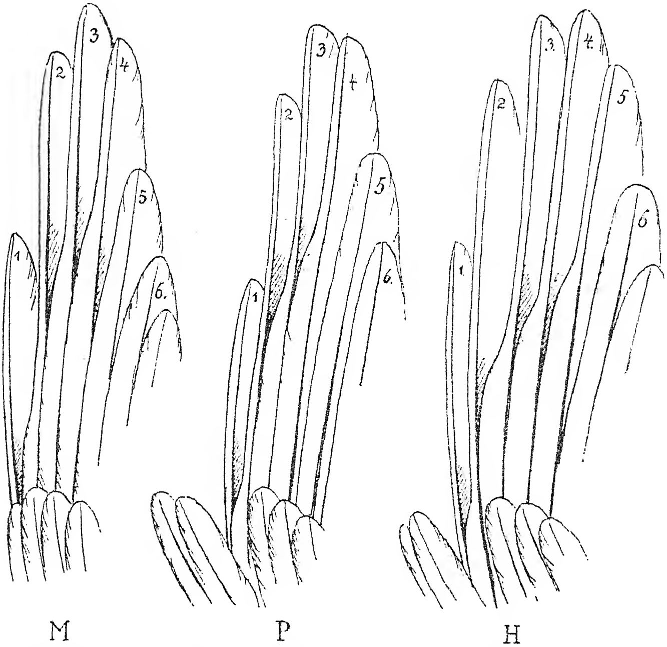
ADULT FEMALE. WINTER AND SUMMER.—(*Upper-parts*) crown dark brown, feathers edged rufous (whitish-buff basally on fore-head); nape and hind-neck with wider and paler edgings, those in middle of nape usually white; rest of upper-parts dark brown, feathers with rufous tips when new; some scapulars with large buff spots; upper tail-coverts white with penultimate spot or bar of dark brown to rufous-brown; (*sides of head*) lores as male; round eyes buffish-white; ear-coverts dark brown, feathers edged rufous; *under-parts* buff to pale creamy-buff streaked dark brown to rufous-brown, darker and less rufous on throat and breast than on belly and flanks; axillaries and under wing-coverts as male but more buffish and with wider streaks; *tail-feathers* broadly barred black-brown, bar at tip very broad, central pair greyish-brown, bars usually not very prominent, next two pairs paler often with some rufous and with bars more prominent, and three outer pairs with varying amount of white and rufous and bars except at tip usually rufous; *wing-feathers*, tips black-brown, very narrowly edged whitish when fresh, outer webs and distal part of inner webs dark brown washed varying amount of grey, basal part of inner webs pale brown to white, all barred black especially prominent on under side of wing; *primary-coverts* dark brown washed varying amount of grey, barred black; *greater coverts* brown, tipped rufous when new; *median* and *lesser coverts* with dark brown centres and broad rufous-buff to pale buff edges, except outer ones which usually have no pale edgings. This plumage is acquired by complete moult as in male.

NESTLING.—At first *down* (A) short but covering bird fairly thickly except on belly where it is rather scanty, white with buffish tinge on sides of head, neck, middle of back and wings, round eye a narrow dark brown ring. Later thickly covered with long *down* (C) which is of about same colour but rather more creamy-buff on upper-parts. (*N.B.*—In this stage only partially feathered birds examined.)

JUVENILE. MALE AND FEMALE.—*Upper-parts* like adult female but edges of feathers of crown and nape more rufous; wider rufous to buff tips to all feathers of upper-parts and especially all wing-coverts; upper tail-coverts white with dark shafts and often rufous-buff tips; (*under-parts*) chin creamy unstreaked; rest of under-parts including under tail-coverts, axillaries, and under wing-coverts deep rufous-buff almost uniform but feathers with slightly darker rufous shaft-streaks; under wing-coverts covering primaries paler buff with large black centres; *tail-feathers* much as in adult female but central pair darker, bands more prominent, blacker and more rufous; *wing-feathers* much as adult female but darker and whitish tips more prominent; *wing-coverts* also darker brown and with prominent rufous tips.

FIRST WINTER. MALE AND FEMALE.—Like juvenile.

FIRST SUMMER. MALE.—Body-plumage sometimes begins to moult in Dec. and occasionally tail, but usually moult does not start until spring. After this moult *upper-parts* are dark grey-brown, feathers of crown and nape more or less edged rufous; (*sides of head* and *under-parts*) ear-coverts, sides of neck, chin, and throat streaked dark brown and rufous-brown, edgings of feathers whitish or pale buff and with varying amount of grey; sometimes mostly dull grey on chin and throat; rest of under-parts white broadly streaked chestnut-brown; *wings* when moulted much as adult male but not so pure grey and lesser coverts with narrow rufous edgings; bars on *tail-feathers* considerably darker than in adult, and usually extending across both webs except in central pair which have very faint indications of broken bars.



Primaries of M. Montagu's Harrier, *Circus pygargus*, P. Pallid Harrier, *C. macrourus*, H. Hen-Harrier, *C. c. cyaneus*, to show differences in wing-formula and emarginations. In P and H primary-coverts are pushed aside to show emargination of 2nd visible primary, which they normally conceal, whereas in M this emargination is exposed. 5th visible primary in M and P is not emarginated and short, in H it is emarginated and longer.

SECOND SUMMER. MALE.—After second moult becomes like adult male but feathers of crown and nape and to less extent chin, throat, and breast very narrowly edged rufous; rest of *upper-parts* browner and less grey than in adult; grey of breast restricted to upper part; pale chestnut streaks of rest of *under-parts* wider than in adult; barring of *tail-feathers* darker; grey of *wing-feathers* more tinged brown than in adult and black bars on secondaries more prominent.

FIRST SUMMER. FEMALE.—Like adult female but *upper-parts* rather darker, *under-parts* darker, *tail-feathers* darker and central pair dark brown not greyish, *wing-feathers* without grey tinge. After next moult females appear indistinguishable from adult.

*N.B.*—A melanistic variety occurs which has whole body-plumage brown-black with varying amount of greyish tinge on *upper-parts* and throat, *wing-coverts* and especially *primary-coverts*, upper tail-coverts and *tail*; sometimes (probably in female or young) bases of *wing-feathers* are whitish and *tail* browner with faint dark bars and occasionally feathers of nape with rufous-buff edges. An example of the melanistic variety had when a nestling " long blackish-brown down."

MEASUREMENTS AND STRUCTURE.—♂ wing 350 (one 340)–370 (one 380) mm., tail 200–220, tarsus 55–60, bill from cere 15·5–16 (12 measured). ♀ wing 350 (one 335)–380. Primaries (1st vestigial one not included): 1st between 5th and 7th, 3rd longest, 2nd and 4th 10–25 mm. shorter, 5th 55–65 shorter, 6th 85–105 shorter; 2nd to 4th emarginated on outer and 1st to 3rd on inner webs (emargination on outer web of 2nd 15–30 mm. beyond tips of primary-coverts). Rest of structure as Marsh-Harrier but only about one-fourth of front of tarsus feathered.

SOFT PARTS.—Bill black, greenish-grey at base of lower mandible; cere, legs, and feet yellow; iris bright yellow, female and 1st year brown (J. Vincent). *H.F.W.*

**Characters.**—No subspecies. Long wings and striped belly distinguish adult male and almost uniform rufous-buff under-parts juvenile from Hen-Harrier, while in all plumages much shorter and unemarginated 5th visible primary and rather shorter 4th primary are distinctive. Female and young of Pallid Harrier are very similar but emarginations of their primaries both on outer and inner webs are higher, *i.e.* nearer bases of feathers, that on outer web of 2nd being nearly hidden by primary-coverts (see fig., p. 65). *H.F.W.*

*PLATE 68.*

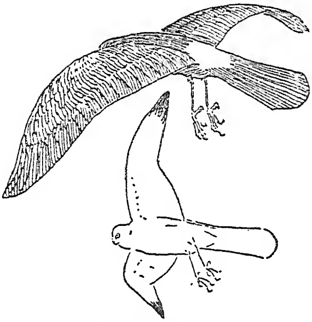
## 273. THE HEN-HARRIER—Circus cyaneus cyaneus (L.)

FALCO CYANEUS Linnæus, Syst. Nat., ed. xii, i, p. 126 (1766—Ex Edwards. Typical locality: near London).
*Circus Aegithus* Forster, Syn. Cat. Brit. B., pp. 2, 45 (1817—New name for *C. cyaneus*, ex Leach, and as figured by Bewick, Hist. Brit. B., pp. 72, 74).
*Circus cyaneus* (Linnæus), Yarrell, i, p. 132; Saunders, p. 317.
*Circus cyaneus cyaneus* (L.), Pract. Handb., ii, p. 154.

**Habitat.**—In breeding-season now confined in Britain to wild moorlands and moorland valleys; on Continent also reedy or sedgy marshes, fens, heaths, cornfields, and steppe country. In winter also frequents open country, including not only such types as above, but also frequently coastal sand-dunes, large open fields, downlands, etc. *B.W.T.*

**Field-characters and General Habits.**—Resembles Montagu's Harrier, but blue-grey male has *large and prominent pure white patch on rump*, is rather paler, and *lacks black mark on secondaries and streaks on flanks*. Female and young also tend to have purer and more extensive white patch on rump, but difference is not absolute. For remarks on difference in build between the two species, see under Montagu's Harrier, and for distinctions from Pallid Harrier, see that species. Length *c.* 17–20 ins.; female larger than male.

Typical harrier flight and mode of hunting (see p. 56), but will occasionally pursue and seize birds as well as pouncing. Settles on ground or on rocks, stumps, posts, etc. Walks and hops with some agility. When scolding on ground tail is jerked up and down incessantly (D. N.-Thompson). Average measurement of pellets $1\tfrac{3}{8}$–$1\tfrac{1}{2} \times 2\tfrac{1}{2}$ ins. (*c.* 35–38×64 mm.), generally deposited at recognized places, seldom very close to nest, and generally on a hillock, dense clump of heather, or other eminence on ground (J. W.-Bond). Migrant birds in Denmark generally roost amongst heather in young plantations (H. Weis). *B.W.T.*



The Hen-Harrier (*C. c. cyaneus*). Female (above), male (below) in flight. (*From a diagrammatic sketch by* H. M. Wallis.)

**Voice.**—Usually silent except in vicinity of nest. Usual cry is a rapid quacking chatter "ke-ke-ke-ke - - -," that of male (which is also the display note: E. Hesse) usually on one note, while pitch of female's is higher, but more or less markedly fluctuating (Hesse, J. W.-Bond). (For differences from Montagu's Harrier see under that species.) Sometimes a drawn-out squealing or wailing note "weeh," "quee," "quee-ow," "beeyüh," etc., precedes the chatter. It is also used separately and may be repeated, but different observers, all apparently describing same sound, differ somewhat in their accounts of its use. It is certainly the regular call of female to male, the begging or "food-call" ("bettelton") of German writers (Hesse, L. Schuster), but W.-Bond mentions it from male only, and D. N.-Thompson describes it as used by both sexes in courting and by male also when hunting and (sometimes) when nest threatened. It is harder and harsher than corresponding call of female Montagu's Harrier, but the "dyo͞oko͞oh" of male bringing food to female appears indistinguishable in the two species (Schuster). Other notes described are: "a shorter, more restrained outburst," "quik-ik-ak-ek," interrupting normal chatter, often used by female when on guard on ground; a sharp, half quacking, half barking "kak" of anger when mobbed (N.-Thompson); "ka-ka-ka" or "ka-ka-rak" in descending pitch from birds circling together or chasing, with first syllable often rather emphasized or modified into grating "ka karrrr" (Hesse), etc. *B.W.T.*

**Display and Posturing.**—Diving display of male recalls that of Montagu's Harrier, but the ascents and descents are ordinarily longer and steeper. Usually after soaring for a time, the bird rises steeply with powerful strokes, so that body assumes almost vertical position, then plunges down again with wings partially folded, but moving all the time, rises again and repeats the manœuvre, and so on. At top of ascent it may turn complete somersault or merely tilt over to one side, and in descending it frequently turns round one or more times on its long axis. Display accompanied by calls (E. Hesse, *Journ. f. Orn.*, 1912, p. 484). Simpler, sweeping and undulating flights, circling of male and female round one another, and other variations also occur. Thus D. N.-Thompson records male diving at female and playfully buffeting her, while she turns over on her back, male tumbling like Raven, drifting momentarily on his back, etc. J. W.-Bond also describes male hanging stationary with tail held strangely erect and records somewhat similar evolutions to the above by female, which after soaring at great height "suddenly sinks lower, moving with stroke and glide, or dives excitedly up and down, yet never pressing her wings to her body." Coition once seen; male chased female, which pitched on heather, then raised and flapped wings; male glided over, hung above her, and then alighted 20 yds. away, raising and flapping wings and then flying over to alight on her back; female raised tail prior to coition and male flapped wings during act (N.-Thompson). *F.C.R.J. & B.W.T.*

**Breeding.**—In Brit. Is. now breeds only on moorlands: formerly also on downs and on Continent, also in cornfields among growing crops, and in alder and willow-grown swamps. *Nest.*—Usually a hollow on ground, lined with a thick pad of dead rushes or grasses with often a number of heather stalks or twigs of birch arranged round it; chiefly, if not entirely, the work of female. *Eggs.*—Usually 4–5, sometimes 6 or 3 only: 7 and 8 have occurred, but in some cases due to removal of eggs before completion of set. Shape rounded ovate: colour bluish-white, nearly always unmarked, but in a few cases with light rusty-red spots, while some sets have definite dark red-brown streaks and spots. Internally green. Average of 100 British eggs, 46·23×36·13. Max.: 52·1×38 and 49·5×40. Min.: 40×32 mm. Average weight, 2·42 grams (2·24 to 2·94 gr., E. Rey). *Breeding-season.*—In Orkneys as a rule about May 10–15, occasionally early in month or end of April. In middle Europe eggs from end of April onward, but as a rule in May, about a fortnight earlier than Montagu's Harrier. *Incubation.*—Eggs laid on alternate days, sometimes 3 or 4 days interval. Brooding begins with second egg as a rule: sometimes with first: female alone incubates, and is fed by male calling her off and "passing" prey in air directly from foot to foot or by drop in air. Period 29–30 days. *Fledging.*—At first male brings all food: female takes it and feeds young in turn, eating remains. Period 5–6 weeks, but young are attended by parents for 2 or 3 weeks later. Single-brooded. *F.C.R.J.*

**Food.**—Chiefly birds and mammals taken by surprise on ground. Mammals include young rabbits, once leveret, mice, field- and water-voles, rats, etc. Birds: frequently Meadow-Pipits, Sky-Larks, or young Lapwings; occasionally chicken or duck, Teal, Red Grouse, Partridge, Golden Plover, Snipe, Dunlin: also finches (Linnet, Chaffinch, Snow-Bunting), Song-Thrush, Blackbird, Ring-Ouzel, and Stonechat. Snakes (adder), lizards, slow-worm, frogs, etc., also taken, and eggs or young of ground-nesting birds (Meadow-Pipit, Dunlin, etc.): small fish also once recorded: also Coleoptera: all records from British sources. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident and winter-visitor (early Oct., occasionally late Aug. and Sept. to 3rd week Ap.). As breeder now practically confined to Orkneys and a very few O. Hebrides, and still probably in some mountain districts of Ireland. In England and Wales has nested in last thirty years Cornwall, Hants, Surrey (1932), Anglesey (1924, 5 and 6, W. Aspden) and Carnarvon, and possibly Devon. Attempted to nest Perthshire 1922, probably bred about 1925 on borders of Cumberland and Dumfries, and bred Inverness 1936. Otherwise only a winter-visitor and autumn and spring migrant. *H.F.W.*

**Distribution Abroad.**—Summer-resident and resident in Holarctic region. Typical race breeds in Europe north to 69½° in Norway, 68½° in Sweden, N. Finland, and 68° in N. Russia: also in W. Siberia to Tarbagatai and

Altai. In south to Portugal, probably N. Spain, central France, central Italy, Sicily, Yugo-Slavia, Albania, Hungary, Romania, and Caucasus. Also Transcaspia and Turkestan, and east to R. Kolyma in E. Siberia. Replaced by an allied race in N. America from Alaska east to Quebec and Newfoundland in north to southern states of U.S.A. Typical race winters south to Mediterranean and its islands, N. Africa from Sahara to Nubia, and S. Asia, from Palestine to Persia, Baluchistan, India, and Burma. Accidental in Færoes. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—Whole *upper-parts* ashy-grey as in Montagu's Harrier but usually paler and purer grey; feathers of back of crown to nape with white bases and often with brown or brownish edgings; upper tail-coverts pure white; (*sides of head*) feathers of lores with black bristle-like tips and white tufts at base; round eye hoary; (feathers behind and under ear-coverts and extending across chin short and slightly curled forming a more distinct facial ruff than in Marsh- or Montagu's Harrier); (*under-parts*) sides of neck, throat, and upper-breast (not extending so far as in Montagu's) pale ash-grey; rest of *under-parts*, axillaries, and under wing-coverts pure white often with a few grey feathers or indications of incomplete grey bars on flanks and axillaries; *tail-feathers* tipped white, central pair ash-grey, mottled white at extreme base, next two pairs with narrow dark grey incomplete bars and inner webs white on basal halves, outer feathers with more white extending to outer webs, especially on outermost pair and bars darker. (*N.B.*—Amount of white and amount of barring varies greatly individually.) Outer five visible *primaries* with about basal third white, distal portion black with ash-grey tips and more or less tinged grey on outer webs, 6th with some grey in middle of inner web and white extending farther, rest of *primaries* and *secondaries* grey with blackish shafts but inner webs white on inner edges almost to tip but with brownish penultimate patch; all *wing-coverts* ash-grey. This plumage is acquired by complete moult apparently as in Marsh- and Montagu's Harriers at no regular period.

ADULT FEMALE. WINTER AND SUMMER.—Except by wing-formula difficult to distinguish from Montagu's and Pallid Harrier; white *upper tail-coverts* usually rather less marked with brown and rufous, *under-parts* rather more broadly streaked, and *under wing-coverts* and *axillaries* browner and less rufous in Hen-Harrier than in other two; *head rather broader* and *facial ruff* extends across chin and is more distinct and more complete in Hen- and Pallid than in Montagu's Harrier; central *tail-feathers* grey-brown, usually with considerable amount of grey tinge on basal half, widely barred black-brown and with wide penultimate bar much as in Montagu's, but rest of feathers barred buff to rufous-buff, not so pale or rufous as in Montagu's, and in some inner ones often with grey tinge; *wing-feathers* as in Montagu's, but basal part of inner webs of primaries and under side of all wing-feathers in Hen- and Pallid whiter than in Montagu's.

NESTLING.—At first *down* (A) short but covering bird fairly thickly but scanty on belly, white with buffish tinge on sides of head, neck, middle of back and wings, round eye a narrow dark brown ring. In this stage indistinguishable from Montagu's Harrier. Later thickly covered with long *down* (C) which replaces very short white *down* (B). *Down* (C) buffish-brown on upper-parts but paler on sides of back, under-parts pale buff, whitish on belly.

JUVENILE.—Like adult female and usually not possible to distinguish with certainty, pale edgings of feathers especially on *crown* and *wing-coverts* usually more rufous than in adult female and *under-parts* often more rufous-buff; pale barring of *tail-feathers* often paler and whiter especially in males but no reliable difference. Distinguished at once from juvenile Montagu's Harrier by its streaked *under-parts*.

FIRST WINTER. MALE AND FEMALE.—Like juvenile.

FIRST SUMMER. MALE.—Moult occasionally begins March but apparently usually takes place summer (June) and is sometimes not quite complete as late as Nov. and Dec. (*i.e.* when bird is eighteen months old) but insufficient moulting birds are available. *Upper-parts* as adult but not so pure grey (more tinged brown) often with some brown-edged feathers on fore-part of crown and on rump; *under-parts* as adult but almost always with a few spots or streaks of rufous-brown and sometimes these are well marked and fairly numerous on lower-breast and under tail-coverts.

SECOND SUMMER. MALE.—After second moult seems indistinguishable from adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 330–355 mm., tail 200–220, tarsus 65–75, bill from cere 15–17 (12 measured). ♀ wing 360–390. Primaries (1st vestigial one not included): 1st between 6th and 7th and sometimes shorter than 7th, 3rd and 4th longest, 2nd 20–30 mm. shorter, 5th 15–25 shorter (equal to or longer than 2nd), 6th 65–75 shorter; 2nd to 5th emarginated on outer and 1st to 4th on inner webs. Rest of structure as Marsh-Harrier.

SOFT PARTS.—Bill black, base bluish; cere, legs and feet yellow; iris and eyelid, ad. ♂ bright orange-yellow, ad. ♀ amber, nestling bluish-grey, juv. (and probably 1st year ♀) brown; cere greenish in immature; "inside mouth (adult female): upper mandible bright blue band on each side of slate-blue centre, lower mandible narrow band of fainter blue, whole gape-margin yellow, tongue slate-black, pharynx and floor of mouth bright pink" (W. H. Dobie). *H.F.W.*

**Characters and allied forms.**—Distinguished from Montagu's and Pallid Harriers in all plumages by much longer and emarginated 5th visible primary, and rather longer 4th primary (see fig., p. 65), besides other differences for which see descriptions. In *C. c. hudsonius* (N. America) adult male is spotted on under-parts and female and young are usually more rufous on under-parts and edges of feathers of crown and nape. *H.F.W.*

*PLATE 68.*

## 274. THE PALLID HARRIER—Circus macrourus (Gm.)

ACCIPITER MACROURUS S. G. Gmelin, Nov. Comm. Acad. Sci. Petropol., xv, p. 439, Pls. viii, ix (1771—Voronezh to R. Don).
*Circus macrourus* (Gm.), P. Grimshaw, Scot. Nat., 1932, pp. 1–2.

**Habitat.**—In breeding-season much as Hen-Harrier; breeds regularly in marshes, but perhaps less addicted to these than Hen-Harrier, frequenting chiefly steppe country and cornfields. In winter-quarters frequents open grassland and savanna with sparse trees to as much as 11,000 ft. (R. E. Moreau, V. G. L. van Someren). *B.W.T.*

**Field-characters and General Habits.**—Adult male is strikingly pale grey bird, some looking almost white at a little distance in strong sunlight, but as Hen-Harriers may also look very pale in similar circumstances and many individuals of present species are actually no paler on upper-parts than Hens, the shade of grey is not always to be relied on. Diagnostic characters are: *absence of pure white rump patch* (at very close quarters rump is barred grey and white, but usually it looks only a little paler than back), *breast and sides of head nearly white*, instead of grey like upper-parts as in Hen-Harrier. Wing rather narrower than Hen-Harrier's, more like Montagu's. Black of wing-tips rather less extensive than in Hen-Harrier, less sharply demarcated from the grey above, while on under-side, if visible, it tapers to point in middle of wing, whereas in Hen black and white meet in approximately a straight line. Females and young cannot be distinguished from those of Montagu's Harrier. Length *c.* 17–19 ins.; female rather larger than male.

Habits identical with those of Hen- and Montagu's Harriers. One record of perching on a tree (T. C. Jerdon). *B.W.T.*

**Voice.**—Breeding-notes resemble those of Hen- and Montagu's Harriers, but exact comparison has not been made. *B.W.T.*

**Breeding.**—Very little reliable information available, but nests not only in drier steppes, but also in swamps. *Nest.*—Built on ground of dead sedges, stalks, etc., and sheltered by growing vegetation. *Eggs.*—Usually 4–5, occasionally 6, or only 3, sometimes unmarked, but more often spotted or blotched with reddish-brown and not infrequently quite heavily marked. Only a small proportion of the eggs in collections has been authenticated; most of them have been collected by peasants and identified by appearance. Average size of 80 eggs (37 by E. Rey), 44·77×34·77. Max.: 50×37. Min.: 40·1×35 and 43·2×32·6 mm. *Breeding-season.*—Mostly dated latter part of May. *Incubation.*—By female alone (H. Grote). Single-brooded. *F.C.R.J.*

**Food.**—British specimens contained Sky-Lark, Meadow-Pipit, and chicken. Records from abroad include mammals (mice, field-voles, water-voles), birds (Yellow Bunting, Sparrow, Calandra and Sky-Larks, and other small birds, chickens, etc.), also eggs or young from nests on ground: frogs, lizards (*Lacerta vivipara, L. viridis*), etc. In winter-quarters, birds (including Little Crake) and lizards (G. L. Bates). *F.C.R.J.*

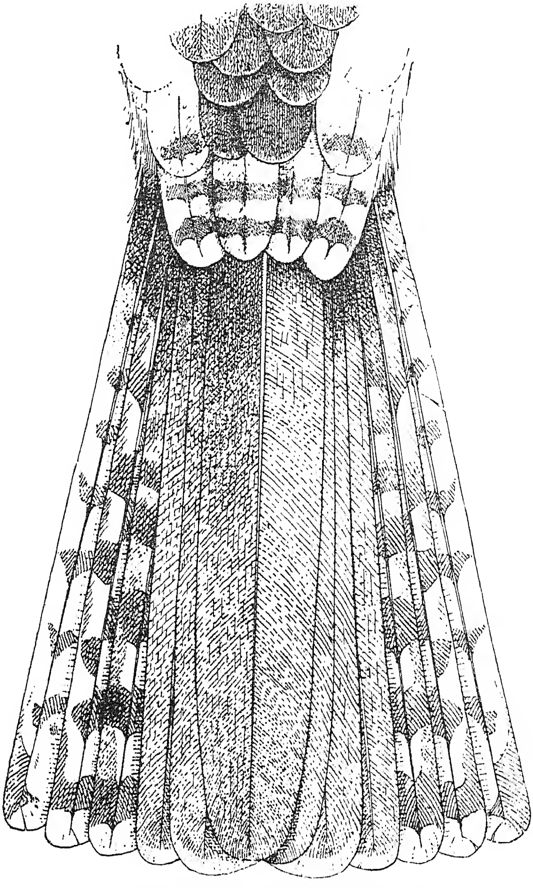
**Distribution.**—*Scotland.*—Male Fair Is. (Shetlands), May 8, 1931 (present for at least a fortnight prior to this date) (*ut supra*). *England.*—Male east Dorset, April 11, 1938 (F. C. R. Jourdain, *Brit. B.*, xxxii, p. 150). *H.F.W.*

**Distribution Abroad.**—Summer-resident in E. Europe and S.W. Asia. Once reported breeding in Sweden: Baltic states (sparingly), probably E. Poland and Ruthenia, Russia (southern Govts. in steppe districts from Petrograd, Novgorod, Ufa, and Perm southward to Caucasia), Romania (Dobrogea), possibly Asia Minor, N. Persia, Transcaspia, Kirghiz Steppes, Turkestan, S.W. Siberia, Semipalatinsk, Altai, and Tarbagatai. Suspected of breeding in Cyprus, Italy, and Germany, but no satisfactory proof. Winters chiefly in Africa, south to Cape, and in Asia to India, Ceylon, and N. Burma. Occurs casually in Finland, Norway, Denmark, Holland, Belgium, France, Luxembourg and Switzerland, and on passage in Mediterranean region, etc. Also recorded from R. Yang-tse in China. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) sometimes rather paler than Hen-Harrier but often same, much paler than Montagu's; centre of rump grey, sides of rump and upper tail-coverts white, broadly banded grey; *sides of head* and *upper-breast* white (not grey as Hen-Harrier or dark grey as Montagu's); rest of *under-parts* white as Hen-Harrier, not streaked as Montagu's; outer *tail-feathers* more widely barred grey than in Hen-Harrier, not such rufous bars as Montagu's and more white; *wing-feathers* much as Hen-

Harrier but black of primaries more restricted on outer feathers, no black bar across secondaries as in Montagu's.

ADULT FEMALE.—Except for differences in primaries (see fig., p. 65) very much like Montagu's and Hen-Harriers, and for slight differences see under adult female Hen-Harrier.



Rump and tail of adult male Pallid Harrier (*Circus macrourus*). (½ nat. size. Drawn by P. A. Clancey.)

NESTLING.—(Not examined.)

JUVENILE.—Like that of Montagu's Harrier and not to be distinguished except by position of emargination on second primary when fully grown.

FIRST SUMMER MALE.—After first complete moult like adult male, but *upper-parts* darker grey with a good deal of brown on head and nape; some brown feathers on wing-coverts; feathers here and there on *under-parts* with fine central streaks of brown or rufous; outer *tail-feathers* with more rufous markings. Males like adults, but not quite so pale grey, and with occasional brown feathers, are probably in second summer.

MEASUREMENTS AND STRUCTURE.—♂ wing 330–356 mm., tail 195–200, tarsus 63–70, bill from cere 15–17 (12 measured). ♀ wing 345–391. Primaries (1st vestigial one not included): 1st between 6th and 7th, 3rd longest, 2nd 17–30 mm. shorter, 4th 4–15 shorter, 5th 52–65 shorter, 6th 85–105 shorter; 2nd to 4th emarginated on outer, and 1st to 3rd on inner webs, emargination on outer web of 2nd hidden by primary-covert, or just visible.

SOFT PARTS.—Bill, legs and feet, and iris as Hen-Harrier. *H.F.W.*

## Genus ACCIPITER Briss.

ACCIPITER Brisson, Ornith., i, p. 28 (1760—Type, according to p. 310 "*Accipiter*," by tautonymy, *i.e. Accipiter nisus*).

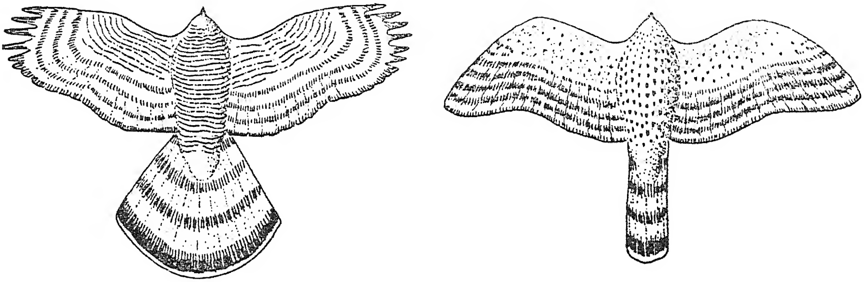
Feet and bill as in *Circus*, nostrils round or oval, also thinly covered by bristles, but wings very much shorter, no kind of "ruff" on face. Separation into genera *Accipiter* and *Astur* cannot be upheld. Eggs white or blotched brown, greenish internally. About 100 species in all parts of world.

*PLATE 69.*

## 275. THE GOSHAWK—Accipiter gentilis gentilis (L.)

Falco gentilis Linnæus, Syst. Nat., ed. x, i, p. 89 (1758—" Habitat in Alpibus," by which, however, the Scandinavian Alps are meant in the first instance, as is quite clear from other statements of Linnæus).
*Astur palumbarius* (Linnæus), Yarrell, i, p. 83; Saunders, p. 331.
*Accipiter gentilis gentilis* (L.), Pract. Handb., ii, p. 158.

**Habitat.**—Frequents forests and wooded districts in both plains and mountains, with a liking for places where woodland is bordered by or interspersed with fields or other open ground; sometimes frequents quite small woods in breeding-season, and where human antagonism has not been too much for it, occurs regularly in settled and cultivated districts. Often in conifers, but also often in beech and other broad-leaved or mixed woods. *B.W.T.*



Goshawk (*A. gentilis*). Left, adult soaring, right, young in ordinary flight, as viewed from below. (*From diagrammatic sketches by* L. Tinbergen.)

**Field-characters and General Habits.**—*Resembles a huge Sparrow-Hawk, having same long tail and rounded wings*, though male, as in that species, is considerably smaller than female. Sexes do not differ except in size, and *colouring recalls that of female Sparrow-Hawk*, dark ashy-brown above, with whitish streak from eye over ear-coverts, whitish below closely barred dark brown, and tail strongly barred. Juveniles and first-year birds have upper-parts lighter, more rufous, and less uniform, and *under-parts warm buff streaked, not barred, with broad, drop-like markings* of dark brown. Length *c.* 19–23 ins.; female considerably larger than male. When flying in the open, notwithstanding quite different outline, it can be confused with Peregrine in brief views from angles at which shape of wings and length of tail are not appreciated, while in soaring the spread tail gives it a very different appearance from that seen in ordinary flight.

Ordinary flight and habits are much like Sparrow-Hawk's except that being a much larger and more powerful bird it takes bigger game. Legs relatively shorter than Sparrow-Hawk's, so that stance is less upright (J. G. Mavrogordato). In its hunting flights it combines speed and a perfect control of movement, the broad wings and long tail enabling it to thread its way swiftly amongst tree-trunks or other obstacles and to check its course or perform abrupt turns with utmost facility. Will wait on the watch for prey on a suitable perch or fly low amongst trees or along borders of woods and fields, relying in either case on a lightning dash on its quarry, often with long glide at end, killing it by formidable grip of the huge claws. According to H. Siewert prey is generally dismembered on the ground in a sheltered spot from which bird can at the same time get a good view round about ; thus borders of thickets and copses are favoured. An unoccupied nest may also be used (G. Schiermann). When young are large female usually tears up prey on a tree some way from the nest, but does not use fixed sites for the purpose. Upper and under mandibles of birds are often left, as well as breast-bone ; in case of large birds shoulder-girdle is sometimes left intact, but not as regularly as by Peregrine (L. Tinbergen). Ordinarily roosts in trees, but in steppe-country where food is plentiful may sometimes be seen on ground in early morning, perched in upright attitude, having obviously spent the night there, though within a few miles of forest (F.C.R.J.). *B.W.T.*

**Voice.**—Silent except in vicinity of nest. Call, used only when birds are undisturbed and unconscious of observation, is " hi-āā, hi-āā," compared to cry of Buzzard, but not so prolonged and with more emphasis on first syllable. A variant of this cry is used in transference of food from male to female. Alarm or warning note (both sexes) when nesting territory is invaded is a rapid, hoarse, strident " gek-gek-gek-gek - - -" but this is also used as call, especially by female, which also has resonant " giak." Call of male " tyak-tyak." In coition a chirruping note (H. Siewert, C. Demandt, and others). *B.W.T.*

**Display and Posturing.**—Has characteristic wing-action during display, with long slow strokes much more like harrier than its own normal flight, employed while flying to and fro over breeding-place or in intervals of soaring, during which tail is not fanned as in ordinary soaring and under tail-coverts are sometimes so much spread that they stand out at sides (C. Demandt, L. Schuster, Geyr v. Schweppenburg). Both sexes perform thus, but Demandt concludes that female chooses breeding-site and uses display-flight and accompanying calls to attract male. Display by male also recorded in autumn (Geyr). In a rarer form the bird, having gained impetus by succession of powerful sweeps of the wings, suddenly closes them and shoots upwards almost vertically, repeating this action eight or ten times (Demandt). Schuster has observed terrific downward plunges of several hundred metres, but not shooting upwards at end, and display-flight may be broken off by bird plunging headlong into wood (Geyr). Coition takes place with much noise and wing-flapping on branch of tree, but not on nest (Demandt) ; initiated by display-note from female, which awaits male with tightly compact plumage, wings rather drooping, and under tail-coverts fluffed out (H. Brüll). *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds in both coniferous and deciduous woods, building a substantial nest, sometimes on foundation of old nest, but always freely added to from year to year : at other times adopting nest of other species, such as Buzzard, and adding to it. Has been known to nest on ground. *Nest.*—Built partly if not altogether by female, of sticks and boughs with smaller twigs and sprays of green conifers or deciduous trees round cup. *Eggs.*—Usually 3 or 4 ; but 2 and even 1 only recorded, while 5 are rare. Shape, blunt ovoid ; colour bluish or sometimes dead white, generally unmarked, but occasionally with light rusty-brown markings and no gloss. Average of 25 Finnish eggs by V. Pousar, 59·64×45·68 mm. Middle European eggs are smaller : 60 German eggs average 57·3×44·7 mm. (Moebert and

F. Groebbels), while Spanish eggs are smaller still (56·3×43). The largest eggs are 65×47·9 and 62×51 (both Lapland). *Breeding-season.*—From beginning April in middle Europe to May, but from early May to June in northern Europe. *Incubation.*—Apparently in some cases begins with 2nd egg, but in others on completion of clutch, the eggs being laid at intervals of at least 2 days, and occasionally 3 or even 4: almost entirely by hen, male taking only a very small share. Period 36–38 days. *Fledging.*—Male at first brings all food in feet to nest: female divides it among young: later both sexes provide food, but when young are nearly 3 weeks old, prey is brought whole and taken by one young bird. Period: at 41–43 days young take to branches (H. Siewert) and soon after can fly. One brood only. *F.C.R.J.*

**Food.**—British records very scanty: (rabbit, pigeon, Moorhen, Partridge, etc.). From Continental sources: mammals (lemming, squirrel, hare and leverets, rabbit, moles, field-mice, rats, young fox, wild cat, etc.): birds (Hooded Crow, Rook, Jay, Magpie: all kinds of game (Black Grouse, Hazel Grouse, Capercaillie, Pheasant, Ptarmigan, Willow-Grouse, Partridge), Wood-Pigeon, Mallard, Teal, Garganey, Stone-Curlew, Redshank, Coot, Moorhen, Red-necked Grebe, Common Tern, Green and Great Spotted Woodpeckers, Kestrel, Buzzard, Sparrow-Hawk, Roller, Long-eared Owl, domestic pigeons, poultry, ducks and geese, many species of passerine birds, especially *Turdidæ* (Fieldfare, Mistle-Thrush, Song-Thrush, Ring-Ouzel), Starling, and smaller birds such as finches, sparrows, tits, dippers, larks, Redstart, Robin, etc., as well as nestlings). Lizards, shells of snails, remains of insects (large lepidopterous larva, grasshoppers, etc.) in stomachs. *F.C.R.J.*

**Distribution.** — *British Isles.* — Rare vagrant. Most recorded examples immature from E. coasts England and Scotland; elsewhere, and especially in W., extremely rare, and has not occurred Wales. One O. Hebrides winter 1887–8, but authenticity of three recorded in Ireland doubtful (R. J. Ussher, *List of Irish Birds*, p. 28); and one reported Kerry Oct., 1922, *may* have been of American form. Nest, probably of wild bird, with four eggs found, and female shot near Grosmont (Yorks) May, 1893 (*cf. Brit. B.*, i, p. 319); pair attempted to nest (female shot) 1864, Normanby Park (Lincs) (J. Cordeaux, *List B. B.*, p. 18); also appears to have bred formerly in Spey valley and elsewhere. *H.F.W.*

**Distribution Abroad.**—A Holarctic species, mainly resident. Typical race breeds in Europe north to 71° in Norway, N. Sweden, N. Finland, and N.W. Russia. In south to France (Pyrenees), Italy, Sicily, Austria, Hungary, Poland, and S. Russia. Replaced by allied races in Corsica, Sardinia, Spain, and ? Marocco (*A. g. arrigonii*): Balkan peninsula and Asia Minor to Caucasus (*A. g. marginatus*): N.E. Russia and W. Siberia (*A. g. buteoides*), by two or three other races in central and eastern Asia to the Pacific: another in Japan, and also by two forms in N. America (see *A. g. atricapillus*). Stragglers occur in Mediterranean region (subsp. ?), Algeria, Tunisia, Malta, Egypt, etc. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) centre of crown blackish-brown with slight slatish tinge; sides of fore-part of crown and line over eye to back of crown whitish, streaked blackish-brown;

back of crown and nape same, feathers being white with blackish-brown tips, those of sides of nape usually also barred as are sometimes those over eyes ; rest of upper-parts brown with tinge of grey, especially when freshly moulted, and very narrow pale tips, shafts of feathers dark ; bases of scapulars and upper tail-coverts barred with white ; (*sides of head*) feathers of lores with black bristle-like tips and white tufts at base ; hind-part of ear-coverts brown to black-brown, sometimes uniform but usually with some whitish streaking, fore-part of ear-coverts white narrowly streaked black-brown ; (*under-parts*) chin white, streaked and usually with some narrow bars of dark brown ; rest of under-parts, axillaries, and under wing-coverts white, feathers with black-brown shaft-streaks and brown to black-brown bars varying considerably in width individually ; under tail-coverts white with a few dark bars here and there ; *tail-feathers* slate-brown, tips white or mottled white, broad penultimate band of dark brown and 3 or 4 similar but narrower bands, feathers somewhat mottled with white, especially on outer pair and on basal portions of inner webs of rest, except central pair which usually has some indication of white near shaft ; *wing-feathers* brown, barred darker brown, with very narrow whitish tips, outer webs with slight greyish tinge, inner webs, except at tip, with a good deal of white mottled with brown (*N.B.*—On under side wing- and tail-feathers appear dull greyish-white barred dark brown) ; *wing-coverts* as rest of upper-parts, but whitish tips usually more noticeable. *N.B.*—There appears no constant difference between ♂ and ♀ in colour or markings. This plumage is acquired by complete moult commencing with wing-feathers in April and body apparently not starting until June, but few moulting examples are available.

NESTLING.—At first *down* (A) rather short with silky tips, covering bird rather thinly, white with faint greyish tinge on upper-parts, dark or grey on lores. *Down* (B) short, white, very sparse. Later *down* (C) grows thickly, pushes out *down* (B) and conceals most of *down* (A), and is of " woolly " structure, head and under-parts creamy-white, upper-parts pale buffish-grey. (See Peregrine, pp. 13-14.)

JUVENILE.—(*Upper-parts*) crown dark brown, feathers edged rufous (paler when worn) ; nape with wider and usually more whitish edges ; feathers of rest of upper-parts conspicuously tipped rufous to buff, those of upper mantle, scapulars, rump, and upper tail-coverts with basal portion creamy or buff barred brown, this feature varying and being conspicuous in some individuals ; whole *under-parts* rufous-buff (almost white when worn), with drop-shaped streaks of dark brown, narrower on throat, tibia, and under tail-coverts ; *tail-feathers* much as in adult but usually bands more contrasted and more mottled creamy-buff on outer feathers ; *wing-feathers* as in adult but pale tips longer and more creamy and often some creamy mottling on outer webs ; *wing-coverts* with rufous to buff tips as rest of upper-parts, *greater* and often *median* with basal portion creamy or buff barred brown.

FIRST WINTER AND SUMMER.—As juvenile. (Breeds in first summer.—E. Hartert.)

SECOND WINTER.—The juvenile plumage does not appear to be moulted until second autumn, but very few moulting examples have been examined. After this first moult bird appears to become indistinguishable from adult, except that often a few juvenile feathers are retained on rump.

MEASUREMENTS AND STRUCTURE.—♂ wing 305–330 mm., tail 210–230, tarsus 70–78, bill from cere 21–24 (12 measured). ♀ wing 340–375. Primaries : 1st between 8th and 9th or shorter than 9th, 4th longest, 5th 3–8 mm. shorter (very nearly equal to 4th), 3rd 3–10 shorter, 2nd 30–45 shorter, 6th 30–35 shorter ; 2nd to 6th emarginated on outer and 1st to 5th on inner webs. Outer secondaries rather shorter than 10th primary, inner ones about as long as 8th, tips rounded. Tail rounded laterally, 12 feathers, tips rounded. About half tarsus feathered on front. Toes rather long, claws long, strong, compressed, very sharp. Bill short, strong, upper sharply curved, compressed and pointed, with slight festoon on cutting edge, lower broad, short and flattish with rounded tip. Nostrils oval, thinly covered by bristle-like loral feathers.

SOFT PARTS.—Bill bluish-black, base paler blue; cere and gape greenish-yellow; legs and feet yellow; iris red-orange, in juv. at first pale greenish-grey gradually becoming yellow and orange (J. G. Mavrogordato). *H.F.W.*

**Characters and allied forms.**—Distinguished from other British hawks by its much rounded wing and large size. For differences of *A. g. atricapillus* see under that form. Many forms have been described, and following European appear distinct: *A. g. arrigonii* (Sardinia, Corsica, Spain) in adult is more slate-black on upper-parts and has closer and darker bars on under-parts, *A. g. marginatus* (Balkans, Caucasus) adult is darker on upper-parts and juvenile is more rufous, *A. g. buteoides* (N. Russia) is large and pale; other eastern forms are distinguishable. *H.F.W.*

*PLATE 69.*

## 276. THE AMERICAN GOSHAWK—Accipiter gentilis atricapillus (Wilson)

FALCO ATRICAPILLUS Wilson, Amer. Orn., vi, p. 80, pl. 52, fig. 3 (1812—Philadelphia).
*Accipiter gentilis atricapillus* W. J. Williams, Brit. B., xiii, p. 31.
*Accipiter gentilis atricapillus* (Wilson), Pract. Handb., ii, p. 161.

**Habitat.**—In breeding-season, conifer forests or mixed conifers and hardwoods. *B.W.T.*

**Field-characters and General Habits.**—Adult differs from European Goshawk in having *upper-parts slate-grey*, with crown almost black, and *under-parts with considerably less bold and definite barring*, cross-bars being more ashy-grey and broken up into irregular cross-markings, while black shaft-lines on breast are developed into wider stripes. These features, however, would only be perceptible at close range, the breast appearing " at a distance, to be plain, pale grey " (A. C. Bent).

Habits as European race, but seems to be a bolder bird, not rarely attacking human intruders at or near nest and inflicting wounds (such attacks nearly always by female). In some winters considerable invasions of Goshawks take place in the United States. *B.W.T.*

**Voice.**—Appears to be identical with that of European race. For details, see A. C. Bent, *Life Histories of N. American Birds of Prey*, pt. i (U.S. Nat. Mus., Bull. 167), p. 136. *B.W.T.*

**Breeding.**—Breeds both in hardwood (birch, poplar, maple, oak, etc.) and conifers (pine, spruce, or fir), building a bulky nest, sometimes in quite a small tree, at other times at a considerable height. *Nest.*—Of sticks and twigs, some broken from living trees, flat on top with slight hollow, lined with bark and decorated with fresh green sprays of fir or other trees; sometimes built on foundation of old nest of some other species and may be used for several years successively. *Eggs.*—Usually 3–4, occasionally 2, and rarely 5, ovate, rather rough in texture, bluish-white or dirty white in colour and unmarked. A. C. Bent gives average of 50 eggs as 59·2×45·1. Max.: 65·5×47·3 and 61·4×47·8. Min.: 52·7×43·9 and 56·1×42·9 mm. *Breeding-season.*—From beginning of April in U.S.A., mostly about mid-April and April to June 14 in Canada and Alaska, mostly mid-April to mid-May.

*Incubation.*—Chiefly by hen. Estimated at about 4 weeks but no definite records: probably at least 5 weeks, as with European birds. Evidently eggs laid at intervals of some days, and incubation often begins before set is laid. *Fledging.*—Estimate of about 4 weeks too low. J. B. and R. E. Dixon found young partly fledged at 32 days and estimate period as 42 days, which is probably much nearer. Food brought by male at long intervals: young fed in turn by female at first: later no doubt both bring food. Single-brooded. *F.C.R.J.*

**Food.**—Chiefly mammals and birds up to considerable size. Mammals include woodchuck, hare, cottontail rabbit, lemming, musk-rat, squirrels, chipmunk, kitten, weasels, shrews, field-mice, etc. Birds: Brünnich's Guillemot, Blue-winged Teal, Mallard, Black and other ducks, domestic poultry, Snipe, Quail, Ruffed Grouse, Ptarmigan, Pheasant, smaller hawks and owls, pigeons and doves, Hairy Woodpecker and flickers, Blue Jay and other *Corvidæ*, Belted Kingfisher, American Blackbirds, Grackles, American Robin, House-Sparrow, Song-Sparrow, Meadow-Lark, etc. Insects: Coleoptera, Orthoptera (locusts and grasshoppers), Lepidoptera (larvæ): also centipedes, small snakes, and once recorded feeding on dead sheep. (For details see A. K. Fisher, *Hawks and Owls of U.S.*: also M. Wood, *Auk*, 1938, p. 123.) *F.C.R.J.*

**Distribution.**—*British Isles.*—Adult male, shot near Strabane (co. Tyrone), Feb. 24, 1919 (*ut supra*), adult male Tresco, Scilly Is., Dec. 28, 1935 (F. W. Frohawk, *Field*, May 30, 1936, p. 1318), adult female near Athenry, Galway, Dec. 23, 1935 (Rohu, *Irish Nat. J.*, 1937, p. 197). Previous records are: One shot near Schiehallion (Perths.) about May, 1869 (*Ibis*, 1870, p. 292), another in Galtee Mts. (Tipperary), Feb., 1870 (*op. cit.*, p. 538), and another shortly afterwards near Parsonstown (King's co.) (*Zool.*, 1871, p. 2525). *H.F.W.*

**Distribution Abroad.**—Summer-resident from N.W. Alaska, N. Manitoba, S.E. Ontario, N. Quebec, and Newfoundland in north: south to interior of British Columbia, Wyoming, Michigan, New York, N. New England, and in mountains to Pennsylvania and W. Maryland. Replaced by an allied race on Pacific coast and islands from Alaska to California. Winters south to S. California, Mexico, and east to Virginia. Casual in Idaho, Arizona, and Florida. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Differ from *A. g. gentilis* in *crown* being slate-black; rest of *upper-parts* dark slate tinged brown (purer slate when freshly moulted) feathers with blackish shafts and except when worn with very narrow blackish edgings; hind-part of ear-coverts blackish; *under-parts* not white barred black-brown, but each feather closely mottled or irregularly barred brown-grey on whitish ground and varying number with prominent black shaft-streak varying in width and most prominent on throat and breast, brown-grey markings more definitely in form of bars in some examples than in others and most prominent on tibia and flanks; under wing-coverts white barred blackish; under tail-coverts white with varying amount of brown-grey barring and often slight mottling; central *tail-feathers* and outer webs of rest and outer webs of *wing-feathers* more slate-grey than in *A. g. gentilis*; *wing-coverts* as rest of upper-parts. *Females* are usually paler grey on upper-parts than males. No moulting examples examined.

JUVENILES.—Like that of *A. g. gentilis.*

FIRST WINTER AND SUMMER.—As juvenile.

SECOND WINTER.—Juvenile plumage appears to be completely moulted in second autumn as in *A. g. gentilis*. Bird then becomes as adult but feathers of breast have broad brownish shaft-stripes and some broad barring varying individually but distinguishing from adult; some juvenile feathers usually retained on rump and occasionally on lesser wing-coverts; feathers of fore-part of crown usually with buffish edgings.

MEASUREMENTS AND STRUCTURE.—♂ wing 320–345 mm., tail 220–250, tarsus 73–80, bill from cere 21–23 (10 measured). ♀ wing 355–370. Primaries: 1st equals 9th, between 8th and 9th or shorter than 9th, 4th longest, 5th 3–8 mm. shorter (rarely equals 4th), 3rd 5–12 shorter, 2nd 30–45 shorter, 6th 20–40 shorter; 2nd to 6th emarginated on outer and 1st to 5th on inner webs.

SOFT PARTS.—As in *A. g. gentilis* but iris in adult crimson. *H.F.W.*

*PLATES 65a, 66, and 69.*

## 277. THE SPARROW-HAWK—Accipiter nisus nisus (L.)

FALCO NISUS Linnæus, Syst. Nat., ed. x, i, p. 92 (1758—" Habitat in Europa." Restricted typical locality: Sweden).
*Accipiter nisus hibernicus* Swann, Bull. B.O.C., xliv, p. 79 (Ap. 1924—co. Down, Ireland).[1]
*Accipiter nisus* (Linnæus), Yarrell, i, p. 88; Saunders, p. 333.
*Accipiter nisus nisus* (L.), Pract. Handb., ii, p. 162.

**Habitat.**—Frequents well-wooded country, but chiefly cultivated districts with scattered woods or at least those where woodland is varied by cultivation or other open ground. Fond of conifer and mixed woods or copses, but also regularly frequents those of purely broad-leaved trees. *B.W.T.*

**Field-characters and General Habits.**—*Long tail, broad rounded wings, barred, not streaked, under-parts, and characteristic mode of hunting* (see below) distinguish Sparrow-Hawk from other native birds-of-prey. Male has dark slate-grey upper-parts with barred under-parts more or less rufous (often strongly so); tail and wing quills browner, with dark bars. Conspicuously larger female has upper-parts considerably browner and under-parts whitish, or only slightly rufous except on flanks, and whitish superciliary stripe. Both sexes have some whitish on nape and there is much individual variation in plumage. Immature birds (juvenile and first winter) have upper-parts brown with lighter rufous edgings to feathers and barring of under-parts broader and more irregular. Length *c.* 11–15 ins.; female considerably larger than male.

When hunting it flies fast and low along wood borders, hedgerows, or fences, down woodland rides or along streams or watercourses. This flight is gliding, with 3 or 4 wing-beats at long intervals. When working a hedge it slips over from one side to the other about every 60–80 yds., ready to pick off any unsuspecting small bird. Has also a slower, but still rapid, form of hunting flight in which it threads its way with astonishing dexterity through the secondary growth of a wood or copse. Though preferring to secure its prey by surprise will not infrequently pursue and fairly out-fly it in the open and, laying aside its habitual caution, will even follow it into frequented thoroughfares or interior of houses. Will also suddenly invade, or keep watch at, places where small birds congregate to feed, etc., suddenly stooping down and seizing one before they have time to take cover. Sometimes picks up prey from ground. Preparatory to hunting often makes a kind of prospecting flight in which it glides or circles at height of 80–120 ft., or sometimes considerably lower in case of male, with 3 or 4 wing-flaps at intervals. Prey may be eaten on branch of tree or very frequently on ground, often on eminence such as mole " fortress," but usually well screened from observation by herbage, or on stump, fence, or pile of faggots. Often leaves behind beak and legs of prey as well as feathers. Old nests of hawk, pigeon, Jay, etc., are also used as feeding platforms in both breeding and non-breeding-season, and abandoned nest is still used for this purpose by old and young for about three weeks after latter are fledged. (Data on hunting, feeding, etc., largely from J. H. Owen, *Brit. B.*, xxv, pp. 151 and 238, and H. E. Pounds, *id.*, xxx, p. 183, which see for fuller details.) On ground walks, but can also hop. Soaring is not infrequent, bird circling upwards generally with 3 or 4 wing-beats from time to time, to high elevation; observed by Pounds in all months from Jan. to June (inclusive), one in Aug. and Nov. Soaring Sparrow-Hawks are often mobbed by small birds, especially those of Swallow family. Exceptionally hovering has been observed. Except near nest in breeding-season usually seen singly, though sometimes pairs appear to keep together throughout winter. Favourite roosting-place is blackthorn thicket or large hawthorn; also small branch of tree against or close to trunk (Owen). Pellets usually small, dark, compact; average size (5 measured) 21×11 mm., diameter from 10 to 12 mm. (C. B. Ticehurst). *B.W.T.*

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[1] Birds (of both sexes) from Ireland and also Great Britain tend to be slightly darker than Continental examples, but there is too much individual variation to justify the separation of the British bird as a distinct race. *H.F.W.*

**Voice.**—Alarm-note in vicinity of nest a rapid, harsh " kek-kek-kek-kek - - -" or " kew-kew-kew-kew - - -" varied to " kyow-kyow-kyow-kyow - - -"; generally a more prolonged note than those of Kestrel or Hobby. L. Tinbergen found the other principal notes were: a cackling cry (less penetrating than the " kek "), a plaintive " vāāl " or " ōōvāāāā " and a high trilling note. J. H. Owen describes call of male bringing food to female as a low version of the " kew-kew-kew," varied to " kee-ōō, kee-ōō, kee-ōō " if female does not respond, or to a soft, rather pleasant " ki-ki-ki " if he brings the food to the nest; also a sibilant, whistling note in display. Another breeding-season note is a soft " gü " or " güi " (A. Voigt). Older nestlings use the " kew " note, but in a different key from the adults, and have also a sort of sibilant whistle and various other notes, " weel, weel, wee-ōō, wee-ōō," " pā-ee, pā-ee," " kā-ee, kā-ōō, kee-uk," etc. (Owen). *B.W.T.*

**Display and Posturing.**—In breeding-season pair will soar together in wide circles to high elevation, first one and then the other uppermost. Tail during these flights is more spread than in soaring display of Goshawk (C. Demandt). Has also peculiar display-flight with long slow wing-beats, either at great height or quite low down. J. H. Owen describes pair flying thus to and fro over length of nest wood, maintaining a horizontal course from end to end and rising at a very steep gradient at each turn: observed from mid-Mar. to mid-May, by male alone as well as by both together, and generally accompanied by sibilant, whistling note. Performance may be concluded by abrupt headlong dive into wood. Male will also fly thus above female while she is perched on a branch, shooting down at her 2 or 3 times with great speed and then resuming flight; similar behaviour is used preparatory to coition, the male descending " with a terrific swish " straight to female without preliminary perching (Owen). Diving with closed wings may follow soaring as well as display-flight and bird may climb again and repeat a number of times; display-soaring may be performed by female alone (E. M. Nicholson). Coition commonly on nest, lasting *c.* 15–20 secs. (H. Siewert). E. Christoleit observed male flying with wing-action as above (compared by him to tern's) in a succession of flat but rather sharply separated curves, but only Demandt has recorded downward diving followed by shooting upwards with closed wings, like Goshawk. Wing-clapping by female has been recorded (G. Bolam), but appears to be exceptional. *F.C.R.J. & B.W.T.*

**Breeding.**—Shows preference for conifers (esp. spruce) in mixed woods, but also builds frequently in pure deciduous woods, often in oaks, generally near main stem. Has been recorded building within 7 ft. of ground in bushes: also in osier-beds and thickets on downs (J. W.-Bond). Shows no tendency to sociability. *Nest.*—Nearly always built by the birds themselves, but at times on foundation of old nest of Crow, Magpie, Jay, Wood-Pigeon, or squirrel, though often quite old and small. Female frequently builds alone, but male at times brings material, usually twigs of larch, but other trees also used; often bulky and rather flat, usually with bits of bark in hollow, sometimes bits of decayed wood or dead leaves as lining. *Eggs.*—4 or 5, 6 not uncommon, occasionally 3 only or 7: 8, 9, and 10 also on record, but in most cases probably high numbers due to presence of second female, for bigamy has been proved to occur in some of these cases. In shape rounded ovoid: no gloss, ground-colour normally bluish-white, occasionally dirty white or greenish and at least twice deep green: sometimes without markings, but generally with blotches, spots, and streaks of dark chocolate-brown, occasionally forming a zone and sometimes concentrated at small end. A scarce variety has numerous light brown markings: others are smeared and clouded with purplish-brown or light red, and violet shell-marks are sometimes present. Average of 100 British eggs, 39·82×31·83. Max.: 46·7×35 and 45·5×36. Min.: 35×28·4 mm. *Breeding-season.*—Full clutches by end of 1st or more often 2nd week of May: exceptionally by end April in south. *Incubation.*—Eggs laid normally at about 48 hrs. intervals, occasionally a 3-day pause: brooding begins usually with 2nd or 3rd egg, exceptionally with last egg (J. H. Owen), normally by female alone, fed by male but not at the nest, but in rare cases male recorded sitting (J. W.-Bond). Period exactly 35 days for each egg in many cases, but 32–34 also recorded. *Fledging.*—Male brings food in feet to nest, or to plucking-place, where hen takes it already dressed and divides it among young. Sometimes the food is transferred in the air while hovering (Owen). Period: usually 24–30 days, occasionally only 21 days (D. N.-Thompson). Single-brooded. (For detailed notes on breeding of this species see J. H. Owen, *Brit. B.*, vols. viii, x, xii, xiii, xv, xx, xxv, xxvi, and xxx.) *F.C.R.J.*

**Food.**—W. E. Collinge working on 109 stomach analyses, estimated birds at 66%, mammals at 6·5%, and insects at 20·5% with 2% vegetable matter. Of the birds, game-birds (16·5%), poultry and ducks (16%), and 9% of useful birds and insects made up a total of 41·5% of an injurious nature. See J. H. Owen (*Brit. B.*, xxvi, p. 40) for relative frequency of birds killed. Those recorded by him 20 or more times are marked with * and those recorded only once † in the following list: Young Rook, Jackdaw, Magpie, Jay (ad. and young), *Starling, *Greenfinch, *Goldfinch, *Linnet, Crossbill, †Scottish

Crossbill, Bullfinch, *Chaffinch, Brambling, Siskin, Redpoll, *Yellow and Reed-Bunting, *House- and Tree-Sparrows, *Sky-Lark, Tree- and *Meadow-Pipit, Pied Wagtail, †Tree-Creeper, †Nuthatch, *Great, *Blue, Marsh, Coal, †Crested and Long-tailed Tits, Spotted Flycatcher, *Willow-Warbler, *Whitethroat, Lesser Whitethroat, Garden-Warbler, Blackcap, *Fieldfare, Mistle- and *Song-Thrush, Redwing, *Blackbird, Wheatear, Whinchat, Redstart, *Robin, †Nightingale, Hedge-Sparrow, Swallow, House- and †Sand-Martin, Swift, Kingfisher, Green, Great and Lesser Spotted Woodpeckers, Cuckoo (ad. and young), †Little Owl, Teal, *Wood-Pigeon, *Stock- and Turtle-Doves, *domestic pigeon, †Fork-tailed Petrel, *Golden Plover, *Lapwing, Dunlin, Redshank, Sandpiper, Greenshank, Woodcock, Snipe, Lesser Tern, Water-Rail, Moorhen, Coot (young), Black Grouse, †Red Grouse, *Partridge (ad. and young), *Pheasant (young). Also Curlew, Oystercatcher, Mallard, Wigeon, Scaup, Sheld-Duck, and Sparrow-Hawk found dead and eaten. Mammals include pipistrelle, rabbit, leveret, small rats, mice, voles, weasel, and mole. Frogs exceptionally taken : also insects : Orthoptera (grasshoppers) and Coleoptera. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident and passage-migrant. Generally distributed where there are woodlands, but is very scarce Orkneys and extreme N. and N.W. Scotland, and does not breed Caithness. Rare vagrant Outer Hebrides, occurs (scarce) on passage Fair Is. and Shetlands. Well-marked autumn passage E. coast, Forth to Thames, mid-Sept. to mid-Nov. and return (less well marked) Mar. and Ap. 48 recoveries of British ringed nestlings indicate that native birds are sedentary. Two Continental migrants ringed Heligoland Oct. and April reached Kent Jan. same winter and Essex Jan. 4 years later and one ringed Holland Oct. reached Staffordshire following Feb. *H.F.W. & N.F.T.*

**Distribution Abroad.**—A resident Palæarctic species. Typical race breeds in Europe north to 69½° in Norway, N. Sweden, central Finland, N. Russia : and W. Siberia. In south to Portugal, Spain, S. France, Italy, Sicily, Balkan peninsula, and Caucasus : also Asia Minor, Syria, N. Iraq, and W. Persia. Replaced by allied races in N.W. Africa (Marocco to Cyrenaica, *A. n. punicus*), Corsica and Sardinia (*A. n. wolterstorffi*), Madeira and Canaries (*A. n. granti*) : from N. Persia and Turkestan to N. Siberia, Manchuria, and Japan (*A. n. nisosimilis*), and in Baluchistan, Himalayas, Tibet, and N. Burma (*A. n. melanoschistus*). Stragglers of typical race occur south of breeding range in winter, and accidentally in Iceland and Færoes. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—Whole *upper-parts* dark slate, feathers of fore-head often edged cream to rufous, feathers over eyes, base of crown and nape white with slate tips, concealed portions of scapulars with considerable amount of white narrowly barred with more or less rufous, longer upper tail-coverts narrowly tipped white ; (*sides of head*) feathers of lores bristle-like, black with tufts of white at base ; upper part of ear-coverts dark slate, lower part and cheeks rufous ; (*under-parts*) chin and throat white to rufous-buff finely streaked dark brown ; rest of under-parts white closely and narrowly barred mixture of rufous and dark brown (bars varying in width and usually narrower on belly and tibia than on breast and flanks), some fine dark brown shaft-streaks on breast (amount of rufous varies considerably individually, most marked on sides and flanks where it often covers most of the feathers obscuring the bars and occasionally whole breast and flanks are thus suffused with rufous) ; under tail-coverts white, sometimes with a few broken brown bars ; axillaries white barred rufous and brown; under wing-coverts white tinged buff and barred black-brown with little rufous; *tail-feathers* brown washed dark slate and narrowly tipped greyish-white with broad dark brown penultimate bar and four or five narrower ones, under-side appears grey barred dark brown; *primaries* brown, outer webs and tips tinged grey, inner webs barred dark brown and basal portions white; *secondaries* same but more grey on outer webs and tips and white on inner webs extending more towards tips; *primary-coverts* brown tinged grey; *rest of coverts* as upper-parts but *lesser coverts* round bend of wing more or less tipped rufous. This plumage is acquired by complete moult commencing with wing- and tail-feathers in May, body not starting usually until later and chiefly July-Aug., sometimes not complete before Oct., and exceptionally Nov. (one full moult Jan. !).

ADULT FEMALE.—Like adult male but *upper-parts* considerably browner, sometimes only tinged slate but often slate-brown with dark slate crown, feathers on sides of nape sometimes barred dark brown and white; (*sides of head*) upper part of ear-coverts brown to dark slate-brown, lower part white to buffish-white streaked dark brown and often tinged rufous; (*under-parts*) chin and throat white to buff streaked dark brown; rest of under-parts white to pale buff closely barred dark brown tinged here and there rufous-brown (bars varying but usually fairly broad and dark, less often narrow and paler), usually some rufous on flanks and occasionally considerable amount on breast and flanks; under tail-coverts more often with bars than in male; axillaries and under wing-coverts strongly barred black-brown; *wing-* and *tail-feathers* as in male but browner less grey. Moult as male.

NESTLING.—At first rather thinly covered with shortish white *down* (A). *Down* (B) very sparse indeed, white. Later *down* (C) grows thickly, pushes out the few tufts of *down* (B), conceals most of *down* (A) and is coarser, longer and more "woolly," white except on wings and back which have pale buffish-grey tinge. (See Peregrine, pp. 13-14.)

JUVENILE. MALE.—Whole *upper-parts* dark brown, feathers narrowly edged rufous but those of upper mantle below white of nape broadly edged; over eye, nape, and scapulars as adult; *under-parts* varying white to pale buff and sometimes rufous-buff, chin and throat streaked dark brown, under tail-coverts often tipped buff and usually with a few spots or short streaks and occasionally bars of dark brown, rest of under-parts barred brown and rufous-brown, bars somewhat irregularly shaped especially on breast where they form arrowhead markings of varying shape and on tibia often very narrow V-shaped; *tail-* and *wing-feathers* sometimes much like adults but usually narrowly tipped and edged buff and with some buff marks on tail-feathers; *wing-coverts* as upper-parts. FEMALE.—*Upper-parts* like juvenile male but edgings to feathers seldom so wide or rufous and thus usually less conspicuous (sometimes not noticeable, on mantle especially); *under-parts* seldom buff or rufous-buff, usually white and bars usually broader and darker than in male.

FIRST WINTER.—Like juvenile. Edgings to feathers on mantle sometimes get worn off, especially in females, by early spring.

FIRST SUMMER.—Juvenile body-feathers sometimes start to moult Mar. and April, but usually not before May, when primaries also start and moult is rather prolonged as in adult but is usually complete by July-Aug. After this moult birds become usually indistinguishable from adults, but occasionally there are a few brown rufous-edged feathers on rump. *N.B.*—Both sexes breed in first summer.

MEASUREMENTS AND STRUCTURE.—♂ wing 190–205 mm., tail 135–154, tarsus 50–56, bill from cere 11·5–12·5 (18 British measured). ♀ wing 230–240, tail 166–176 (12 British measured). Primaries: 1st equal to or shorter than 10th, 4th longest, 5th as long or 2–3 mm. shorter, 3rd 5–15 shorter, 6th 10–18 shorter, 2nd 30–40 shorter, 7th 40–45 shorter; 2nd to 6th emarginated on outer and 1st to

5th on inner webs. Tail square, 12 feathers, tips slightly rounded. Tarsus very slender and long and about one-fourth feathered in front. Other structure as Goshawk, but nostrils more thickly covered with bristle-like loral feathers.

SOFT PARTS.—Bill slate, tip blackish-horn ; cere, legs, and feet yellow tinged greenish ; iris bright chrome-yellow (nestling iris at first dull and dark, becoming paler and greenish-grey and in juv. gradually becoming yellow (J. G. Mavrogordato), skin round orbits pale greenish ; " inside mouth (juv. ♀ Sept.) : palate slate-blue, deeper over central vomer and lateral palate-bone ridges ; side and tip of under mandible deep blue, tongue blue-black, floor of mouth pink " (W. H. Dobie). *H.F.W.*

**Characters and allied forms.**—Distinguished from other British hawks by its much rounded wing, and by much smaller size than Goshawk. *A. n. punicus* (N.W. Africa) is slightly larger and paler grey on upper-parts, *A. n. granti* (Madeira) is dark with very dark broad bars on under-parts, *A. n. wolterstorffi* (Sardinia) is similar but smaller, *A. n. nisosimilis* (Siberia, China, Japan) is large and pale, *A. n. melanoschistus* (Himalaya) is very dark on upper-parts and very rufous on under-parts ; other forms have been described. *H.F.W.*

## Genus MILVUS Lacépède

MILVUS Lacépède, Tabl. méthod. Ois., p. 4 (1799—Type by tautonymy : *Falco milvus*).

Differs from other British genera of Falconiformes by long tail being more or less deeply forked. Wings long. Upper bill with very flat festoon or rounded " tooth." Nostrils free, longitudinal and obliquely placed. Tarsus short, not or barely longer than middle toe, about half covered with feathers. 3rd and 4th visible primaries longest, 5th not much shorter. Old World. Eggs white, marked brown, green internally.

*PLATES 65a, 70, and 71.*

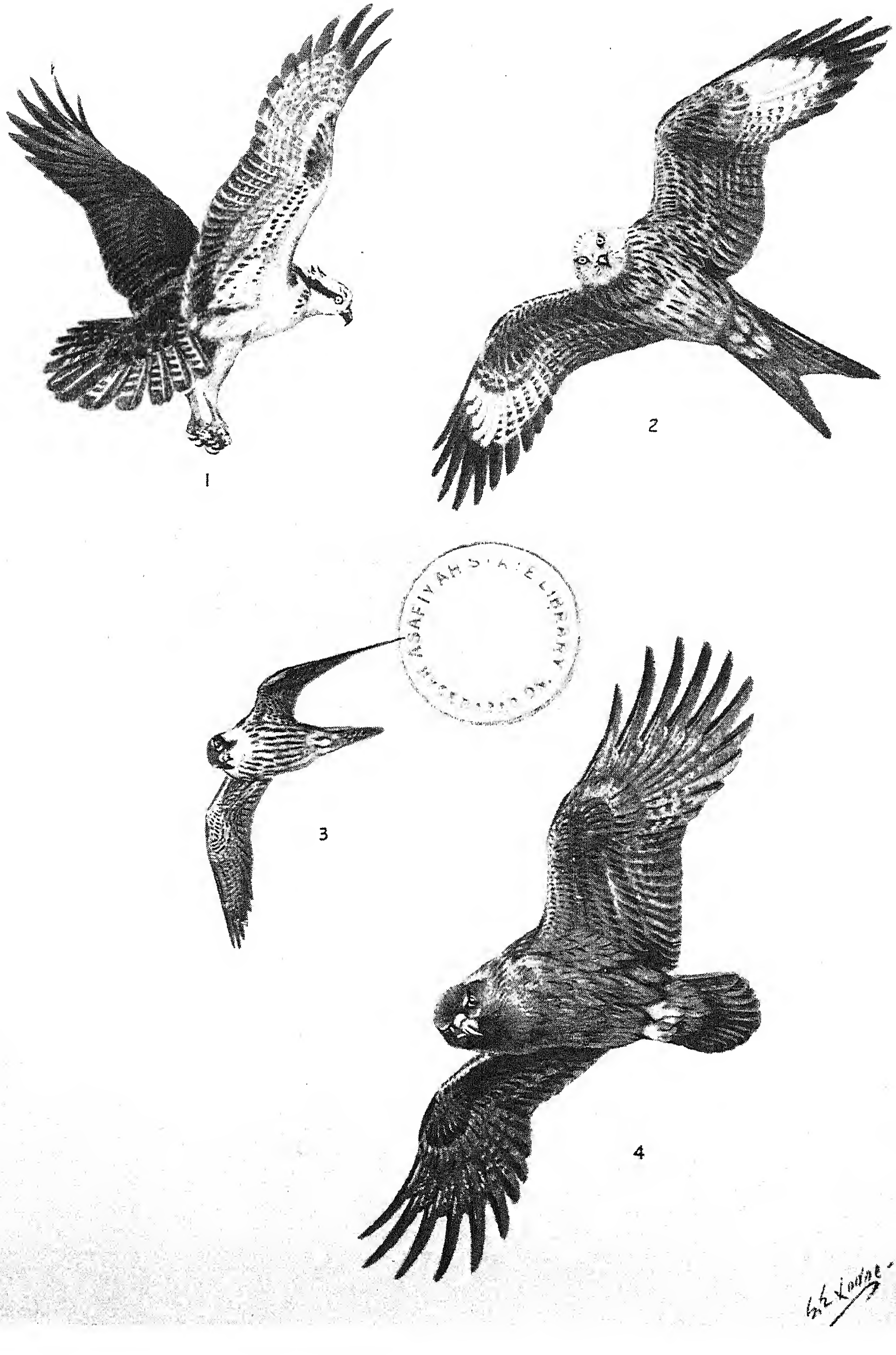
## 278. THE KITE—Milvus milvus milvus (L.)

FALCO MILVUS Linnæus, Syst. Nat., ed. x, i, p. 89 (1758—Europe, Asia, Africa. Restricted typical locality : S. Sweden).
*Milvus regalis*, Seebohm, Hist. Brit. B., i, p. 74.
*Milvus ictinus* (Savigny), Yarrell, i, p. 92 ; Saunders, p. 335.
*Milvus milvus milvus* (L.), Pract. Handb., ii, p. 166.

**Habitat.**—In Britain now confined to wild, hilly country with wooded valleys. On Continent, though occurring to some extent in hills and mountains, is found mainly in lowlands and often in cultivated districts with scattered (especially old) woodlands, as it formerly was in this country ; also breeds in open park-like or scrub country with scattered trees, and outside breeding-season sometimes occurs in still more open country. *B.W.T.*

**Field-characters and General Habits.**—In its great soaring powers Kite resembles Buzzard, but *much longer, narrower, and more angled wings and deeply forked tail* give it a quite different appearance. A *pale, whitish patch on underside of wing* is also distinctive. Upper-parts dark brown with lighter borders to feathers ; under-parts rusty-red with dark streaks, head greyish with dark streaks (nearly white in old birds). Primaries blackish ; tail rufous. Young paler and duller, with browner head. Length *c.* 24–25 ins., sexes not differing appreciably in size.

PLATE 71



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1, Osprey. 2, Kite. 3, Hobby. 4, Golden Eagle.

In 15th century abundant even in the streets of London, Kite has been reduced in Britain to very small remnant. Even on Continent, though often frequent enough, it is nowhere as abundant in breeding-season as is Black Kite in favourable districts. Like Buzzard it will sail for hours in wide circles high in the air ; at such times steering action of tail is often very noticeable. Direct flight is also not unlike that of Buzzard, but perceptibly lighter and more buoyant, with generally longer glides and wing-beats appreciably slower. Will hover momentarily while prospecting for prey. Perches chiefly on trees ; on ground is said generally to hop rather than walk. Practically all prey is taken on ground ; seldom quick or agile enough to capture adult birds on the wing, but F.C.R.J. in S. Europe has seen it catching flying insects with feet and transferring them to beak in the air. Vertebrate prey is devoured on ground or branch of tree, or in spring, according to J. W.-Bond, often brought to nest even before eggs are laid. In winter in some districts of Mediterranean region becomes gregarious, and flocks of several hundreds have been described collecting to roost together. Flocking on smaller scale also formerly recorded in England in winter. *B.W.T.*

**Voice.**—On the whole a rather silent bird, in contrast to Black Kite. Usual note is shrill, mewing " weeōō-weeōō-weeōō," recalling Buzzard's, but higher-pitched and more rapidly repeated, though much less frequently used. Also, especially in spring, a prolonged whinnying cry, recalling that of Black Kite, which may follow or be interpolated between mewing notes or developed in other combinations, with variations of length and pitch. According to O. Völker notes are higher-pitched than those of Black Kite. A shrill single scream of alarm when mobbed by other birds is also mentioned (J. W.-Bond). *B.W.T.*

**Display and Posturing.**—In display-flight in March male and female not only soar and ring round one another, but also frequently hover like huge Kestrels (D. N.-Thompson). *F.C.R.J. & B.W.T.*

**Breeding.**—In Wales usually breeds in tall slender oaks, sometimes ivy-grown, in hanging woods on hillsides, but in Scotland most nests appear to have been in pines. *Nest.*—Built by both sexes, but chiefly by hen, usually close to main stem, not out on branch, of sticks solidified by earth, noticeably flat on top and lined with lumps of wool, moss, sometimes hair and, whenever available, rags or paper. All sorts of rubbish, remains of dead animals, bones, tufts of grass, dung, etc., also occur at times. *Eggs.*—2–3, but 3 more frequently : 4 also occurs rarely. Colour white, without gloss, often feebly marked with brown, but at times blotched and spotted with varying shades of reddish- to purplish-brown. Dark hair-lines are rather characteristic. Many Welsh eggs are pointed ovoid in shape, but in a series from other countries this is not characteristic and resemblance to those of Buzzard is often close. Average size of 58 British eggs, 56·97×45·09. Max. : 64×46·6 and 60·3×49. Min. : 52·6×42·9 and 54·9×42 mm. *Breeding-season.*—Usually about mid-April onwards in Wales : occasionally a week earlier : about a fortnight earlier than Buzzard. In S. Spain breeding begins quite six weeks earlier. *Incubation.*—Usually begins with 1st egg : interval of about 3 days between them : apparently by female alone, leaving nest to feed (G. Davies), but male said also to bring food to nest. Period about 28–30 days, but confirmation desirable. A. Claudon's estimate (21–25 days) obviously too low. *Fledging.*—Male at first provides food, but very little for first few days: after a fortnight both sexes bring much food. Period 50–54 days (Davies). Single-brooded. *F.C.R.J.*

**Food.**—British records though scanty show a wide range. Mammals (rabbits and young leverets, squirrels, moles, rats, mice, etc.), also carrion of any kind: birds (especially chickens and ducklings from farmyards, Lapwings, Red Grouse and young formerly freely taken in Scotland, occasionally Partridge, pigeon, Redwing, young Curlew, ducks, including Mallard and Scoter, young Rooks and Jackdaw): frogs and at times earthworms in quantity. Continental records are naturally far more numerous and include among mammals, hamsters, water-vole, weasel: birds (Cuckoo, Jay, Partridge, Starling, Sky-Lark, perhaps injured or dead): frogs, snakes, lizards, slow-worms, and stranded fish. Also insects: Orthoptera (grasshoppers and crickets), Coleoptera (taken and eaten on the wing), etc. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Resident. Formerly abundant, now confined to mid-Wales, where only five birds known in 1905, but by 1910 increased to about 10 pairs, and 10 to 12 pairs up to 1920 when much reduced, and in 1928 only 7 pairs located; from 1933 to 1937 in one area 5 or 6 pairs, but never more than 4 nests located and one of these of a barren pair, in 1938 fifteen birds in all known, twelve of which paired and three young reared (D. T. Raikes). Nested Devon 1913 and seen same year in Somerset, Derby, and probably Bucks, also seen in Devon 1933 and 1934; nested Cornwall 1920; seen in 1917 in Perthshire, in June 1919 in Argyllshire, and one trapped Kincardine Ap. 1929, but now only a very rare straggler elsewhere than in breeding haunts. *Ireland.*—Recorded occurrences cannot be substantiated (R. J. Ussher, *List of Irish Birds*, p. 28). One Blake Knox coll. Kilcool, co. Wicklow, Nov. (year unknown) (*Irish Nat.*, 1924, p. 103). *H.F.W.*

**Distribution Abroad.**—A W. Palæarctic species. In Europe north to the Baltic and 61° in Sweden, Baltic states, Poland, Romania, and S.W. Russia (to Kiev and Volhynia Govts.). Also N. Persia. South to W. Canary Is., N.W. Africa (Marocco to Tunisia). Islands of W. Mediterranean and N. Palestine to Caucasia. Replaced by allied race in Cape Verde Is. (*M. m. fasciicauda*). N. European birds migrate to Mediterranean region. Has bred Norway and Denmark. Casual Heligoland, Holland, W. Russia, Åland Is., and recorded Malta, Crete, and Cyprus. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) crown and nape white with varying amount of rufous, closely streaked brown-black, feathers narrow and pointed; upper mantle brown-black, feathers somewhat pointed and with broad chestnut edgings, rest of mantle and back same, but feathers rounder and with narrower and darker rufous edgings and tips; scapulars same but browner and concealed portions of feathers with narrow brown bars; upper tail-coverts chestnut with black shaft-streaks; feathers of lores with black bristle-like tips and white tufts at base; (*under-parts*) ear-coverts, sides of neck, chin, and throat white narrowly streaked black, feathers loosely constructed; rest of under-parts chestnut, feathers of breast widely streaked black with pale buff edgings at tips; flanks rather less widely streaked, belly narrowly streaked, and centre of belly and under tail-coverts with only black shaft-lines; axillaries as flanks, under wing-coverts with large black centres and lowest series with dark brown centres and bars and greyish edgings and tips, sometimes tinged rufous; *tail-feathers* chestnut, extreme tips and bases of inner webs pale buff to whitish, outer pair narrowly barred black and with a good deal of black at tip and on outer web, penultimate pair with less black at tip and on outer web, next pair with only a little black at tip of outer web and bars usually confined to inner web, next pair usually with very incomplete bars on basal portion only and central pair with only spots, which lengthen to short bars at base under the tail-coverts; *outer primaries* with long tips and outer webs black, inner webs white with some blackish mottling, *inner primaries* with outer webs greyish-brown often tinged rufous and inner webs narrowly barred black (white inner webs of primaries forming large white patch on under-wing); *outer secondaries* brown-black, paler on inner webs with inconspicuous bars, *inner secondaries* brown tinged rufous, white at base of inner webs and barred across both webs; *wing-coverts* much as rest of upper-parts but with wider chestnut edgings, *lesser coverts* with black restricted to broad streaks. *N.B.*—Bases of body-feathers and under-down white. There is considerable individual variation in depth of chestnut, but in worn plumage this is always paler. This plumage is acquired by complete moult, but the period cannot be defined as the only moulting adult examples examined were dated Oct. (2) and Feb. (2).

NESTLING.—At first rather thickly covered with *down* (A) with silky hair-like tips especially long on crown which has a crested appearance; and some short tufts of *down* (B). Crown and nape creamy to buffish-white, blackish in front of and over eye, rest of upper-parts buffish-brown tinged pinkish and whitish basally, under-parts creamy-white. In one example examined *down* (C) was commencing to grow and appeared to be of a more rufous-buff colour.

JUVENILE.—(*Upper-parts*) feathers of crown and nape shorter and less pointed than in adult, rufous-brown with long whitish or buff tips; feathers of mantle with small pale buff tips not so noticeable as on crown; (*under-parts*) upper-breast and flanks with narrower black streaks than in adult and tips of feathers whitish or buff; rest of under-parts unstreaked pale buff, feathers with chestnut edges; *wing-coverts* and *inner secondaries* with paler buff tips than in adult; rest of *wing-feathers* as adult; *tail-feathers* duller and with considerably more blackish both at tips and bases, black bars wider and a wide subterminal one on all feathers but usually not complete on central pair.

FIRST WINTER AND SUMMER.—The juvenile plumage commences to moult in October and new feathers are much as adult but those of crown and nape are more rufous-edged and not so white. Moult is very gradual and apparently does not involve any wing-coverts nor tail- or wing-feathers and usually a good many body-feathers are not moulted. Material is wanting to show exactly when adult plumage is acquired.

MEASUREMENTS AND STRUCTURE.—♂ wing 480–500 mm., tail: centre 220–250, outer 300–345 (depth of fork 60–110), tarsus 58–64, bill from cere 27–30 (7 measured). ♀ wing 480–515, tail: centre 220–260, outer 310–365. Primaries (1st vestigial one not included): 1st between 6th and 7th, 4th longest, 3rd as long or 5–15 mm. shorter, 2nd 45–65 shorter, 5th 10–30 shorter, 6th 90–110 shorter; 2nd to 5th emarginated outer webs, 1st to 4th abruptly emarginated and attenuated inner webs, 5th not so clearly. Outer secondaries about equal 10th primary, inner ones becoming longer and longest equal to 7th primary, tips rounded. Tail deeply forked, 12 feathers, tips rounded. About half front of tarsus feathered. Claws curved and very sharp, that of middle toe with prominent inner edge. Bill rather broad at base, upper mandible much compressed, curved and sharply pointed at tip which projects, cutting edge with a slight curved projection, under mandible short, shallow, and with rounded tip. Nostrils elliptical and just reached by tips of bristle-like loral feathers.

SOFT PARTS.—Bill black tip, yellow at base and cere; skin round eye and legs and feet yellow; iris amber-yellow. *H.F.W.*

**Characters and allied forms.**—Large size and very long and deeply forked chestnut tail distinguish it. *M. m. fasciicauda* (Cape Verde Is.) is darker and has a rather shorter, darker, strongly barred tail including central feathers, and is somewhat intermediate between this species and Black Kite. *H.F.W.*

*PLATE 71.*

## 279. THE BLACK KITE—Milvus migrans migrans (Bodd.)

Falco migrans Boddaert, Tables Planches Enl., No. 472, p. 28 (1783—Based on Daubenton's pl. 472, several countries of Europe mentioned, typical locality: France (Hartert, 1914)).
*Milvus korschun korschun* (Gm.), Hand-List, 1912, p. 119.
*Milvus ater*, Seebohm, Hist. Brit. B., i, p. 80.
*Milvus migrans* (Boddaert), Yarrell, i, p. 97; Saunders, p. 337.
*Milvus migrans migrans* (Bodd.), Pract. Handb., ii, p. 169.

**Habitat.**—In breeding-season largely in cultivated country in neighbourhood of woods, especially near lakes and inland waters, but also commonly frequents uncultivated districts with open woodland or scattered trees and may be regularly found hunting over barren steppe and desert areas far from woods. In east of range haunts towns and villages as scavenger and in N.W. Africa appears fonder of dry, barren, and rocky districts than in Europe. *B.W.T.*

**Field-characters and General Habits.**—*Darker and dingier-looking than Kite and tail much less deeply forked,* appearing almost straight-edged when expanded to the full. Young have pale patch on under-wing recalling that of Kite, though smaller and much fainter, but in adults this is absent or much obscured. Upper-parts very dark brown, under-parts rufous-brown, some a good deal darker than others. Head paler, usually looking more or less greyish-brown in field, but by no means so pale or so clearly differentiated from body as in Kite. Young paler with less uniform upper-parts (pale tips to feathers), making more contrast between quills and rest of wing. Though isolated pairs occur, is naturally *sociable*; often met with in large flocks and breeding almost in colonies. Frequently seen flying over water and a common sight on the Swiss and other lakes, as well as on large rivers and estuaries, where it feeds on (largely dead) fish picked up from surface. Slightly smaller than Kite, length *c.* 22–23 ins.; sexes do not differ appreciably in size.

Flight as Kite, perhaps rather lighter and more buoyant. Apart from fishing habits, takes prey from ground much as Kite, but is more of a scavenger where it has the opportunity. Large numbers will congregate at carrion, and even in Europe, where it is not, as in the Levant, strictly a town-haunting bird, it is readily attracted by offal and rubbish dumps, and will follow ships on rivers and canals to pick up floating refuse. A number may also frequently be seen walking about on ground in fields, etc., apparently in search of insects, and it has been recorded hawking insects in the air. Readily avails itself of leavings of other fish-eating or predatory birds, and will frequent breeding-places of Herons, Cormorants, and vicinity of eyries of Osprey, Peregrine, etc., for this purpose. Roosts in woods or copses, sometimes a number together outside breeding-season. *B.W.T.*

**Voice.**—Much more noisy than Kite. In breeding-season has a peculiar half whinnying, half squealing cry not unlike young of one of the larger gulls, and another like "*queeū*-kiki-kiki-kik," with variants, which is evidently the alarm or anger note. Also calls, though less freely, at other seasons. A soft, hoarse rattle is recorded in display (E. Hesse). *B.W.T.*

**Display and Posturing.**—E. Hesse observed a diving display in which presumed male plunged down in zigzag course with half-closed wings at presumed female, swerving upwards again as the other bird turned momentarily on its back to meet it. H. Sick witnessed several times an extraordinary performance in which the pair grasped claws in the air and remained poised with beating wings in an upright position for a matter of seconds before beginning to fall and in doing so to revolve like a propeller round their interlocked feet as axis, at first slowly, then faster, but with astounding regularity throughout and never so rapidly as to suggest loss of control. In four such performances the birds appeared always to tumble nearly to the ground before disengaging themselves. *F.C.R.J. & B.W.T.*

**Breeding.**—Shows a strong tendency to sociable breeding, many nests being placed at no great distance apart, though solitary nests also occur. *Nest.*—Generally built by the birds themselves, though old nests of other species (Raven, Crow, Heron, Stork, or Cormorant) occasionally used as foundation. New nests usually rather small, apparently built by both sexes, of sticks, twigs, earth, dung, moss, paper, and nearly always with rags in interior. Usual site is in tree, but some nests in S. Europe are placed on bushes growing on face of cliffs. *Eggs.*—More often 2 than 3, exceptionally 1 only; 4 rare, and 5 recorded two or three times. Colour white, no gloss, with a few blotches, spots, streaks, or hair-lines of sepia or reddish-brown: sometimes unmarked. Average of 100 eggs (63 by E. Rey), 52·92×43·33. Max.: 61×42·3 and 55·7×46·1. Min.: 47×39·8 and 53·5×39·5 mm. *Breeding-season.*—Last week April and first ten days May in Mediterranean region; from early May to June in middle and E. Europe. *Incubation.*—Both sexes take part (L. Schuster and others), but male seen to call hen off to feed together (P. Bernhardt). Period not less than about 4 weeks, but no exact records. *Fledging.*—Young fed by both parents. Period 42–43 days. Single-brooded. *F.C.R.J.*

**Food.**—On Continent near lakes and rivers, largely fish, often floating dead or dying: also carrion and garbage. Food extensively studied by Arrigoni and others: mammals include rabbit, mole, field-voles, shrews, and mice: birds, chickens, Starlings, and occasional small bird: snakes (*Tropidonotus natrix* and *tessalatus*), lizards (*L. viridis*), frogs, toads, and newts: fish (*Cottus, Esox, Gobio, Leuciscus, Tinca,* etc.): insects: Collembola (*Smynthurus*), Orthoptera (*Acridium, Gryllotalpa*), Odonata (*Libellula*), Hemiptera (*Acadidæ*), Trichoptera (*Phryganeidæ*), Coleoptera (*Carabidæ, Hydroporus, Hydrophilus, Silpha, Elater,* etc.), Diptera (*Stratiomyidæ*): Mollusca (*Limnæa*): Crustacea (*Cypris, Cyclops, Asellus, Palæmonetes*): Annelida (*Lumbricus*). Probably some of the minute forms recorded above are accidentally taken (*e.g.* Collembola and Crustacea). *F.C.R.J.*

**Distribution.**—*Great Britain.*—Three. Adult male Alnwick (Northumberland), May 11, 1866 (Hancock, *Ibis*, 1867, p. 253). Male Aberdeen, April 16, or 18, 1901 (G. Sim, *Ann. Scot. Nat. Hist.*, 1901, p. 133). Juvenile Is. of Scilly, Sept. 16, 1938 (A. A. Dorrien-Smith, *Brit. B.*, xxxii, p. 237). *H.F.W.*

**Distribution Abroad.**—Palæarctic, Ethiopian, Oriental, and Australasian regions, but not breeding far north. Typical race is summer-resident in

Europe, north to S.W. and E. France, Switzerland, Germany, Czecho-Slovakia, Hungary, Poland, Baltic states, and Russia (north to 63° and east to Perm, Ufa, and Orenburg Govts.): also in Transcaspia, Aralo-Caspian region, Turkestan, and W. Siberia (R. Ob). In south from N. Sahara and Marocco to Tunisia; in Mediterranean in Sicily, and from Italy to Macedonia and Bulgaria: also Asia Minor, Syria, Palestine, Armenia, Persia to N. Baluchistan. Replaced by allied races in Egypt, Nubia, Sinai, and S. Palestine (*M. m. ægyptius*), in S. Arabia (*M. m. arabicus*), from E. Russia through Siberia to Japan and south to Himalayas and N. Burma (*M. m. lineatus*), in India to Siam (*M. m. govinda*), in tropical Africa and Madagascar (*M. m. parasitus*), and in Australia, Papua, etc. (*M. m. affinis*). Has occurred in Sweden, Åland Is., and Finland (has bred), Denmark, Heligoland, Belgium, Holland, also in Balearic Is., Corsica, and Malta. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) crown and nape brownish-white, often with a rufous tinge, closely streaked black, feathers narrow and rather pointed; rest of upper-parts very dark brown, usually uniform but sometimes with tips of some feathers dark rufous, especially when freshly moulted; basal portions of scapulars barred; (*sides of head and under-parts*) feathers of lores with black bristle-like tips and white tufts at base; ear-coverts, sides of neck, chin, and throat white or whitish-brown streaked brown-black; breast varying greyish-brown to rufous-brown, feathers rather pointed and with wide mesial brown-black streaks, which are outlined with pale brown; rest of under-parts more rufous-brown with narrow black shaft-streaks, amount of rufous varying individually but brightest on lower belly, tibia, and under tail-coverts (occasionally these parts nearly as bright as in *M. milvus*); axillaries and under wing-coverts as in *M. milvus* but edgings not so bright rufous; *tail-feathers* brown, sometimes with a rufous tinge, barred black-brown; *outer primaries* with long black tips, proximal portions brown, inner webs mottled pale brown to greyish-white, *inner primaries* dark brown with faint blackish bars on inner webs (inner webs of primaries form a palish patch on under-wing, but not a white one as in Kite); *secondaries* with blackish tips tinged purplish, inner webs brown barred blackish, innermost feathers paler and sometimes with basal part of inner webs white or whitish; *greater wing-coverts* much as secondaries; *median* and *lesser coverts* dark brown with blackish shafts and pale brown or rufous edgings varying individually but usually rufous. This plumage is acquired by complete moult beginning in May and extending to autumn, but no winter adults have been available for examination.

NESTLING.—Down much as in Kite, but whole head and neck white except for blackish mark through eye, rest of upper-parts considerably paler pinkish-brown, under-parts white. Later there grows very thickly all over the body a shorter, coarser *down* (C) without long silky hair-like tips, grey on upper-parts, rufous-buff on under-parts but pale grey on crown and throat. Here and there, especially on belly, *down* (C) replaces a short *down* (B) as in Peregrine (see pp. 13-14).

JUVENILE.—*Upper-parts* very dark brown, feathers with black shafts and rufous-buff to whitish tips; longer and paler (usually whitish) on crown, nape, and *lesser wing-coverts; under-parts* paler brown, feathers with yellowish-buff wedge-shaped tips often continued in a buff central streak varying individually but widest and most prominent on upper-breast; *tail-* and *wing-feathers* as adult but tipped buff and basal portions of inner webs whitish or white, making a small whitish patch on under-wing.

FIRST WINTER.—The juvenile plumage commences to moult in December, new feathers sometimes like adult but usually more rufous on nape and breast. Moult seems confined to body and not all body-feathers are moulted apparently.

FIRST SUMMER.—A complete moult commences in April after which bird appears to become indistinguishable from adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 417–452 mm., tail: central feathers 200–235, outermost 230–260 (depth of fork 20–40), tarsus 53–60, bill from cere 24–27 (12 measured). ♀ wing 430–465. Primaries (1st vestigial one not included): 1st equal to or slightly longer or shorter than 7th; 4th longest, 3rd as long or 5–20 mm. shorter, 2nd 30–50 shorter, 5th 5–20 shorter, 6th 50–80 shorter; 2nd to 5th emarginated outer webs and 6th very slightly, 1st to 5th abruptly emarginated and attenuated inner webs. Rest of structure as Kite, but tail much less deeply forked, and when much worn (especially in young birds) with very little fork.

SOFT PARTS.—Bill horn-black; base of lower mandible, cere, legs, and feet orange; claws black; iris greyish. *H.F.W.*

**Characters and allied forms.**—Black Kite is easily distinguished from Kite by smaller size, much less deeply forked tail, and darker colour. *M. m. ægyptius* (Egypt) has darker crown, rather more deeply forked tail, and adult has yellow bill, *M. m. arabicus* (S. Arabia) is smaller and darker, *M. m. govinda* (India) has darker crown and under-parts, and whiter bases of primaries than in *M. m. migrans* but black bill; other forms occur in Africa and Australia. *H.F.W.*

[NOTE.—A BLACK-WINGED KITE, *Elanus cæruleus* (Desfontaines), is said to have been shot in co. Meath about 1845 (Saunders, p. 338, see also *Zoologist*, 1875, p. 4455).]

[NOTE.—Several specimens of the AMERICAN SWALLOW-TAILED KITE, *Elanoïdes forficatus* (L.), which inhabits N. and S. America, have been recorded as taken in Great Britain, but the claims for the admission of this species are in our opinion insufficient (*cf.* Saunders, p. 338).]

## Genus **HALIÆETUS** Sav.

HALIÆETUS Savigny, Descr. Egypte, Zool., Syst. Ois., pp. 68, 85 (1809—Monotype: *H. nisus* Sav. = *albicilla*).

Enormous birds with very broad wings, in which the primaries are comparatively little longer than secondaries. Bill very large and thick, upper mandible first straight, strongly curved near tip. Nostrils free, oval, or rounded. 3rd to 5th visible primaries forming tip of wing. Tail short, half as long as wing or less, cuneiform to nearly straight. Tarsus short, about as long as middle toe, one-eighth to one half feathered, rest bare. Nestling with long down, chiefly on head, reminding one of those of *Milvus*. Eggs white, greenish internally. Almost cosmopolitan, but absent from S. America.

*PLATE 67.*

## 280. THE WHITE-TAILED EAGLE—Haliæetus albicilla (L.)

FALCO ALBICILLA Linnæus, Syst. Nat., ed. x, i, p. 89 (1758—" Habitat in Europa, America." The latter erroneous. Restricted typical locality: Sweden).
*Haliæetus albicilla* (Linnæus), Yarrell, i, p. 25; Saunders, p. 329; Pract. Handb., ii, p. 172.

**Habitat.**—Frequents cliffed and rocky coasts and islands, wooded islands of the Baltic, inland lakes in wooded districts, and vicinity of marshes, estuaries, etc. In S. Russia also frequents steppe country in the interior far from water (A. v. Nordmann). In winter visits coasts and waters where it does not breed and young especially are great wanderers. *B.W.T.*

**Field-characters and General Habits.**—In flight large size, *enormous breadth of wing and distinctly shorter and more wedge-shaped tail than Golden Eagle,* which give it a quite vulturine appearance when soaring, are distinctive.

*Light coloured, almost white head and transparent-looking white tail of adult* make confusion with Golden or other eagles impossible, but *immature birds have tail dark brown.* At rest a heavy, lumpish-looking bird lacking alertness of Golden Eagle, while at close range huge deep bill (*cf.* figs., p. 42) and tarsi not feathered to base of toes are further points of difference. Length *c.* 27–36 ins.; female generally larger than male.

Flapping flight, with rather slow wing-beats, appears somewhat laboured and heavy, having been compared to that of Heron; wings are then more or less angled, but in soaring they are held perfectly straight; primaries widely separated. Perches both on rocks, trees, posts, etc., and on the ground. Will sit motionless for hours on ground or perched near water's edge, looking more like a brown stump than a bird (F.C.R.J.), and will even stand for long periods in shallow water watching for fish (V. Wendland). Usual mode of fishing, however, is flying low over water, often picking up fish from the surface, but sometimes plunging right in. Low flight is equally characteristic when hunting other prey, in which it relies mainly on surprise, being insufficiently agile to catch birds on the wing; will work along reed-belts like a Marsh-Harrier, sometimes poising in a kind of hover, but with relatively slow wing-action, and will sometimes secure diving birds by gradually exhausting them (Wendland, H. Siewert). Siewert found pellets under nest consisted mainly of feathers; largest measured was *c.* 10×4 cm.; texture usually very loose and often mixed with plant remains (G. Niethammer). Roosts according to locality in cliffs, trees, or even on ground; recorded roosting regularly on tops of sand-dunes in winter. Immature birds in particular are rather sociable and will roost together. Wendland records as many as ten young birds associating and states that pairs associate throughout year. *B.W.T.*

**Voice.**—Usual cry a querulous chatter insignificant for so large a bird (F.C.R.J.), described by V. Wendland as a loud, shrill "krikrikrikri - - -"; used both as call and note of excitement or agitation, but more pronounced alarm or anger is expressed by a deep, gull-like "găh găh găh găh" (Wendland). *B.W.T.*

**Display and Posturing.**—Like other birds of prey male and female soar together over nesting-site in breeding-season, often close together and sometimes half tilting over to one side, but a regular display-flight has not been recorded (V. Wendland). Same observer witnessed coition on the ice of a frozen lake, lasting 10–12 secs. and accompanied by wing-flapping. *F.C.R.J. & B.W.T.*

**Breeding.**—In Brit. Is. almost all nests seem to have been placed on ledges or recesses of cliffs, usually by the sea, exceptionally on flat islets in lochs or among rocks on hill-tops. Abroad frequently builds in trees near inland marshes or lakes or among high reeds and on sand-banks in estuaries. *Nest.*—In cliff sites, used for many years, nests became huge structures, but newly made nests were often quite scanty—a few sticks or heather stalks, driftwood, tufts of grass, moss, seaweed, etc., with lining of luzula, grass, and at times wool. When built in trees abroad they are generally substantial edifices. *Eggs.*—Normally 2: but 1 only in case of old birds, and 3 occasionally recorded in Brit. Is. and also abroad: one case of 4 eggs (Romania): some are chalky-white, others slightly glossy: yellow stains not uncommon, but doubtful if any true markings. Shape blunt ovate. Average of 54

British eggs, 75·8×58·7. Max.: 84·2×62·2 and 78·4×64. Min.: 67·5×53·4 mm. *Breeding-season.*—About April 10–22 in Scotland: from late February to April on Continent. *Incubation.*—Begins with first egg (H. Siewert): by both sexes, but far greater share taken by female: male seen to bring fish to incubating female: period estimated at from 35 (F. Faber) to *ca.* 45 days. *Fledging.*—Male provides food, brought to nest in feet, and female divides it among young. Period: in down about 50 days (Faber), but not fully fledged till *ca.* 10 weeks old. Young remain in neighbourhood for about 4–5 weeks longer (Banzhaf). Single-brooded. *F.C.R.J.*

**Food.**—British records from coast refer chiefly to salt- and fresh-water fish, living or stranded (including cod, grey gurnard, salmon): mammals (mostly lambs and rabbits), carrion of any kind, and of birds, domestic poultry and ducks, with occasionally sea-birds or waders. Hares also recorded: birds (Sandpiper, dead Wood-Pigeon, Kittiwake and other gulls, Guillemot, Puffin, Grouse, Coot). Foreign records from eyries on inland lakes as well as coasts show greater variety. Mammals include dog, fox, roe-deer, squirrel, mole, hedgehog. Birds, many species of ducks (Mallard, Teal, Merganser, Eider, etc.), Hooded and Carrion-Crows, Rook, Lapwing, Curlew, Great Crested Grebe, terns, young Heron, Osprey, Blackbird. Sea-fish include cat-fish, lump-fish, halibut, etc.: fresh-water fish, pike, carp, etc. *F.C.R.J.*

**Distribution.**—*British Isles.*—Formerly resident, now only rare migrant. Up to about end eighteenth century bred Lake District, Is. of Man, and in Is. of Wight up to 1780 (probably this species), and widely distributed in Ireland and Scotland, and up to middle of nineteenth century still in fair numbers northern Scotland and islands and parts Ireland, but towards end of century became reduced to a few pairs in some W. and N. Scottish Is. Became extinct Ireland some years previous to 1911, and reduced to one pair Scotland (Shetland), which bred until 1908 when male was killed and subsequently the other bird (albino) of pair brooded on nest each year until 1918 when it disappeared. Now rare migrant (Nov. to March, occasionally Oct. and April, very rarely Sept. and May), one or two appearing most years near E. or S. coast England, very occasionally inland and in west, and rarely in Scottish Is. and elsewhere. *H.F.W.*

**Distribution Abroad.**—A Palæarctic resident species. In Europe breeds in Iceland and on Continent north to 70° in Norway, N. Sweden, N. Finland, and N. Russia (Yalmal, Novaya Zemlya, Waigatz ?). Also Siberia (to Tjumen), Semipalatinsk to Altai, N.W. Mongolia and Kamtschatka. Greenland bird has been separated. In south to N. Germany, Czecho-Slovakia, Hungary, Yugo-Slavia, Albania, Greece, Bulgaria, Romania, S. Russia (Crimea), Caucasia, Asia Minor, Syria, Iraq, N. Persia, Transcaspia, Lower Amu Darya, Kirghiz Steppes, and Turkestan. Also probably Corsica, Sardinia, and formerly N.E. Africa. Has occurred in Færoes and as winter vagrant in W. and S. Europe to Mediterranean and islands, Canaries, and Egypt to S. Baluchistan and India. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) feathers of crown, nape, and sides of neck lance-shaped, bases brown more or less mottled pale brown, shafts dark brown, tips brownish-white or yellowish-white (paler when worn than when fresh); rest of upper-parts darker brown with a purplish gloss when fresh, feathers of mantle having paler tips, which become whitish when worn, scapulars darker and more glossy; shorter upper tail-coverts dark brown as rump but sometimes slightly mottled with white at tips, long upper tail-coverts white with bases dark brown somewhat mottled with white and tips same with variable amount of brown and mottling; feathers of lores bristle-like with short tufts at base creamy-white; (*under-parts*) chin, throat, and upper-breast much as crown and nape, but feathers not so elongated and usually with wider dark brown shaft-streaks; rest of under-parts, axillaries, and under wing-coverts as upper-parts, but with scarcely any purple gloss and feathers with narrow pale brown tips; *tail-feathers* white, concealed bases brown with some white mottling, tips sometimes with some brown specks; *primaries* brown washed grey with whitish shafts, tips blackish with brown shafts; *secondaries* same but basal portions not so grey and tips not so dark; *wing-coverts* as upper-parts. This plumage is acquired by complete moult which seems of a gradual nature. Insufficient moulting birds have been available to state a period, but moulting examples dated June, Dec., Jan., and Feb. have been examined.

NESTLING.—At first *down* (A) creamy-buff to buffish-grey rather darker and greyer under and behind eyes, on wings and rump and whiter on chin and throat, rather long with hair-like tips, covering bird fairly well but not thickly and with bare patch on each side of belly, back of tarsus and distal half of front bare. Some very short whitish tufts of *down* (B). Later a much coarser, more woolly and longer *down* (C) growing very thickly replaces *down* (B) (exactly as in Peregrine, see pp. 13-14). *Down* (C) crown, under-parts, and sides of back dark greyish-buff, upper-parts and wings paler, whitish at base of down.

JUVENILE.—(*Upper-parts*) feathers of crown dark chocolate-brown towards bases, edges pale reddish-brown, bases white; feathers of nape same but with small pale brown tips and more white and reddish-brown basally; mantle and scapulars with much more pale reddish-brown, only shafts and distal central part of feather being dark chocolate-brown; rump same but paler and with smaller dark tips; longer scapulars more uniform dark brown with purplish tinge often mottled pale or whitish-brown; longer upper tail-coverts, more or less mottled with brownish-white or pale brown; *under-parts* much as upper-parts but often with more white, especially on breast where paler reddish-brown portion of feather is often replaced by white more or less washed pale brown; tibia and tarsus more uniform dark brown; *tail-feathers* with outer webs and tips of inner webs black-brown slightly mottled whitish-brown, rest of inner webs whitish-brown mottled black-brown; *wing-feathers* as in adults but proximal portions not so grey and shafts browner, *inner secondaries* more or less mottled whitish-brown on distal portions and innermost feathers pale brown with dark tips; *wing-coverts* much as upper-parts.

FIRST WINTER.—Like juvenile.

FIRST SUMMER.—A complete moult appears to take place beginning Feb., new plumage appears to be like juvenile but tail-feathers are slightly less mottled dark brown especially on inner webs.

SECOND SUMMER.—(*Upper-parts*) crown and nape intermediate between juvenile and adult not so dark as former but not with brownish-white tips of adults; upper-parts much as adult but bases of feathers white; upper tail-coverts with a considerable amount of white mottling; *under-parts* as adult but with still more white on basal part of feathers than in upper-parts; *tail* much as juvenile, but with rather more white; new *wing-feathers* grey-washed as in adult but inner secondaries mottled brownish-white.

THIRD SUMMER.—Insufficient moulting birds are available to determine exact sequence of plumage and birds which are very much like adults but have feathers of breast somewhat like juvenile, feathers of crown not so white-tipped as adult and tail-feathers (especially outer two or three pairs) with some black-brown at tips, are probably in their third or fourth summer.

MEASUREMENTS AND STRUCTURE.—♂ wing 57–65 cm. (measured with tape, see vol. i, p. xxxiv), tail 22·5–28 cm., tarsus 90–110 mm., bill from cere 48–55

(14 measured). ♀ wing 61–68·5 cm., bill 50–62·5 mm. Primaries (1st vestigial one not included): 1st between 7th and 8th, 3rd and 4th longest, 5th sometimes as long, sometimes 5–10 mm. shorter, 2nd and 6th 15–30 shorter; 2nd to 7th emarginated outer webs, 1st to 5th abruptly (and 6th much less so) emarginated and attenuated on inner webs. Outer secondaries shorter than 10th primary, inner ones becoming longer and longest about equal to 7th primary, tips rounded. Tail rounded, two central pairs about equal and longest, rest graduated, 12 feathers, tips rounded. Tarsus feathered half-way down. Claws much compressed, strong and curved, that of middle toe broadly grooved on inner side. Upper mandible very large and deep, compressed, curved and tip projecting beyond under mandible, which has rounded tip and is straight and shallow. Nostrils oblong and very sparsely covered by bristle-like feathers of lores. (See fig., p. 42.)

SOFT PARTS.—Bill and cere pale yellow (in juvenile bill horn-colour, cere greenish); legs and feet yellow, claws blackish; iris yellow (in juvenile brown).
*H.F.W.*

**Characters and allied forms.**—Large size (great bulk), enormous bill, graduated tail and scutellated and partly bare tarsus distinguish White-tailed Eagle from other British birds. Greenland birds have been separated (*H. a. groenlandicus*) as larger, but the measurements appear to overlap considerably. *H.F.W.*

## **Genus PERNIS** Cuv.

PERNIS Cuvier, Règne Animal, i, p. 322 (1817—Monotype: *P. apivorus*).

Differs from other Falconiformes by lores and fore-head being covered with small scale-like feathers without any bristles whatever. Cere nearly as long as rest of bill. Nostrils in obliquely placed slit. Wings long, generally 3rd and 4th visible primaries about equal and longest. Tarsus short and strong, nearly or quite half covered with feathers, entirely scutellated. Europe and Asia to Malayan Archipelago, in winter Africa. Eggs with yellowish shell, as a rule entirely covered with brown-red.

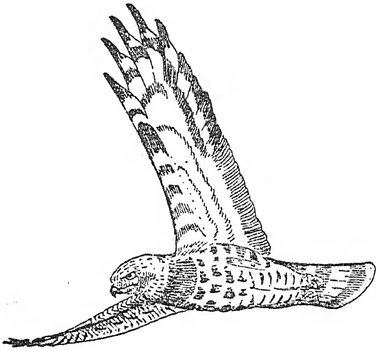
*PLATE 71.*

### **281. THE HONEY-BUZZARD—Pernis apivorus apivorus** (L.)

FALCO APIVORUS Linnæus, Syst. Nat., ed. x, i, p. 91 (1758—Europe. Restricted typical locality: Sweden).
*Pernis apivorus* (Linnæus), Yarrell, i, p. 121; Saunders, p. 339.
*Pernis apivorus apivorus* (L.), Pract. Handb., ii, p. 175.

**Habitat.**—In breeding-season found in or near broad-leaved (often beech) or mixed woods and copses, as well as in pure conifers, preferring rather open growth of trees or places where woodland is interspersed with glades or open places. *B.W.T.*

**Field-characters and General Habits.**—In flight recalls Buzzard, but *wings rather longer and narrower and tail longer; head and neck usually rather more extended and banding of tail different.* Seen from below Buzzard shows whole tail narrowly barred, with broad subterminal band; Honey-Buzzard has several broad dark bands, of which the distal one and the next are more widely separated than the rest. Under-side of body and wings (except in dark type: see below) usually more boldly variegated than in Buzzard. Note (*q.v.*) also distinct. Upper-parts dark brown, sometimes with some white marks, top and sides of head usually more or less grey. Under-parts very variable, ranging from white with only a few dark markings through types with bold dark blotches and bars on white ground (commonest) to uniform dark brown like upper-parts. Young birds are either almost uniformly dark or show varying amount (sometimes a great deal) of white on head, with whitish under-parts more streaked and less barred than in adults and sometimes white flecks on upper-parts. Length *c.* 20–23 ins.


The Honey-Buzzard (*P. apivorus*) in flight.
(*From a diagrammatic sketch by* H. M. Wallis.)
(For other figures see p. 51.)

Flight as Buzzard, but, though soaring fairly freely, spends less time in the air than that species. Sometimes hovers. Perches on trees, etc., and settles freely on ground, where it walks with ease in manner compared to corvine or gallinaceous bird and can run quite rapidly. Though it also captures small vertebrates on ground like Buzzard, characteristic mode of feeding is by digging out wasps', and more rarely humble-bees', nests. These are excavated with feet, which, according to H. Ringleben, are used alternately with great regularity, but apparently with some assistance from bill, and in order to reach deeper nests bird will sometimes dig for a considerable distance; Lilford records a case where one had penetrated so far into a hole that only its tail protruded. F. A. Cerva observed one attacking wasps' nest in hollow tree. The insects are taken with the bill and according to Naumann are captured with great dexterity, the bird's quickness of movement enabling it habitually to seize them transversely in such a way that tip of body with sting can be immediately nipped off with edge of mandibles. The same authority states that wasps in the crop of a Honey-Buzzard are always found to be rendered innocuous in this way. Pellet formation feeble and irregular (remains of wasps' nests and chitinous debris) (G. Niethammer). Though regularly migrating in flocks, normally occurs singly in winter-quarters. *B.W.T.*

**Voice.**—A much more silent bird than Buzzard, though some pairs are rather more vocal than others. Ordinary note on wing is rendered "pü*ih*ü" and "pihā," with variants, the more trisyllabic and higher-pitched version being apparently that of male, while the disyllabic form may be shortened to a drawn-out monosyllable more like "quih." All these notes are more whistling and squeaky than Buzzard's and in part more grating. Bird arriving at nest used note like "pyow" or "pyā," rather suggesting spitting of cat, to which sitting bird answered with rapidly repeated "teckōō - - -," "tackōō - - -," or "tecke - - -." Also a screaming, owl-like "pichuh" ("ch" guttural) when alarmed (E. Hesse). Rapidly repeated note mentioned by Hesse is presumably same as that (rendered "teck") described by O. Heinroth as very different from those of other raptors and recalling loud, hard, prolonged version of Black Redstart's scold or still more a distant motor-bicycle! A melodious double note of male mentioned by K. Gentz, though the rendering "trōōlüüh" might represent Hesse's "pü*ih*ü" or variant, would appear to be distinct, being described as having some resemblance to Curlew, though much softer and more muffled. Food-call of nestlings rendered "dee-dee-dee" (Heinroth), but after fledging note is much like that of adults, though rather thinner. *B.W.T.*

**Display and Posturing.**—Has a display-flight like Buzzard's in which it repeatedly dives downwards and sweeps up again at the end of the dive (E. Hesse), and another in which it rises steeply, hovers for a few seconds striking wings together above back either once or 2–3 times in quick succession, drops again, and repeats the performance several times (Hesse, V. Wendland). Naumann describes this as performed by male as interlude to high soaring flight of both birds together over nesting-place, and sometimes male will dive down at female soaring below him. An attitude with wings partly or fully spread, recorded for both sexes at nest, evidently expresses excitement or nervousness (K. Gentz, Wendland), while a plainly audible chattering of bill by female is also a mark of strong excitement and sometimes accompanies nest-relief (Gentz). Wendland noticed that one bird observed by him stretched up neck in a peculiar manner when uneasy on nest. Male when excited spreads feathers of head and neck like scales, giving a kind of crested effect instead of feathers standing out separately as in eagles, etc. (Wendland). *F.C.R.J. & B.W.T.*

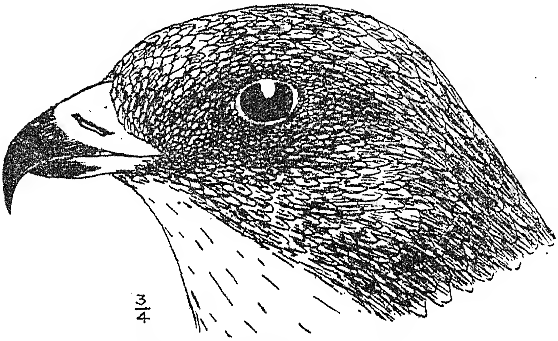
**Breeding.**—Breeds in forest where timber is of good size, especially beech-woods, but also in oaks and conifers (pine, spruce, etc.). *Nest.*—Generally built up on foundation of old nest of some kind at considerable height (such as Crow, Buzzard, Goshawk, etc.), usually but not always on side branch, and variable in size, but small when built mainly or altogether by the birds themselves. Both sexes appear to bring decorative sprays of green beech or other leaves to line nest, but chiefly female, renewing them every evening. *Eggs.*—Normally 2, occasionally 1 only, and rarely 3, rounded slight ovoid in shape: very handsome, white ground being often almost entirely hidden by wash of deep, rich purplish-red or red-brown, at times chocolate, often very deep in colour: or with smears and blotches of red-brown here and there. Average of 25 British eggs, 50·22×41·39 mm.: average of 100 Continental eggs (29 by E. Rey), 50·82×41·09. Max.: 60×41 and 53·6×44. Min.: 46·5×40·1 and 47·3×37·7 mm. *Breeding-season.*—Late: eggs not laid till end of May at earliest, usually full sets by about June 10, but occasionally not till end of month. *Incubation.*—Eggs laid at irregular intervals: 3 days minimum, but 4 and 5 days also recorded. Begins to sit normally with 1st egg: perhaps occasionally with 2nd: both sexes take part, but female takes greater share: male shot had incubation patch (C. Sachse). Period estimated variously at 30 to 35 days. *Fledging.*—Young fed by both sexes in early stages, male delivering food to female which actually feeds young, but later both bring food to nest. Food brought in bill and crop: for first two weeks from crop. When nearly fledged fed only at long intervals (D. N.-Thompson). Period 35 to 52 days: usually 40–45 days. As young return to nest after leaving it, estimates naturally vary. Single-brooded. *F.C.R.J.*

**Food.**—During summer in Brit. Is. main food consists of Hymenoptera (chiefly wasp grubs, but also wild bees and honey, humble-bees (*Bombus lapidarius*, etc.), hornets, and pupæ of ants), also Orthoptera (*Locustidæ*), Dermaptera (*Forficula*), Odonata, Lepidoptera (larvæ of *Noctuidæ*, *Plusia gamma*, etc.), Coleoptera (*Melolontha*, etc.). Other food occasionally taken includes small mammals (probably mice), nestlings and eggs of birds, including eggs of Spotted Flycatcher, Song-Thrush and Wood-Pigeon, frogs, lizards, and according to Gilbert White " many grey snails " (slugs). Continental records include also lizards, slow-worms, snakes and worms, as well as fruit and berries. *F.C.R.J.*

**Distribution.**—*British Isles.*—Formerly regular, but rare, summer-resident in England, especially in New Forest, now very rare and irregular. Had not been known to breed since 1911 until 1928 when one pair nested in one locality near Welsh border up to 1932 ; another in another locality in south bred 1923 and 1932, and probably a pair has bred here since in some years. Also recorded breeding Hereford 1895, and Durham 1897 and possibly 1898, 1899, and has bred as far north as Aberdeen and E. Ross. Otherwise now uncommon passage-migrant (May-June and chiefly Sept.-Oct., occasionally Nov. and rarely other months), most often E. coast Great Britain, but occasionally elsewhere and in E. half Ireland. *H.F.W.*

**Distribution Abroad.**—A Palæarctic summer-resident. Western race breeds in Europe north to N. France, Belgium, Holland, Germany, Denmark, S. Norway, N. Sweden, Finland, and Russia to Archangel, and 58° in Perm Govt. Also W. Siberia (Tobolsk). In south to Cantabrian Mts. (N. Spain) and Portugal, central Italy, Greece, Bulgaria, Romania, Crimea, N. Caucasus, and probably Asia Minor. Replaced by a larger eastern race in E. Siberia, and in Japan (possibly separable). Western race winters in tropical and southern Africa : eastern race, N. India, Burma, etc. to Java. Has occurred casually in the Færoes and Canaries. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—*Upper-parts* dark brown, bases of feathers white, in some examples entirely concealed but in most showing very considerably on whole crown and nape, feathers of which have oval-shaped tip of dark brown usually edged pale brown and rest of feather white ; scapulars and upper tail-coverts often showing some white, bases being barred brown and white, upper tail-coverts when fresh with greyish tips ; (*sides of head*) lores and round eyes and sometimes extending on to fore-head and moustachial region and rarely on to chin more or less grey or tinged grey (grey usually more marked in males) ; *under-parts* very variable in distribution of white and brown, whitest examples have only a few dark brown shaft-streaks and broad subterminal spots, other " white " examples have larger and more numerous spots and streaks, most usual variety has narrowly streaked throat and broad brown subterminal bars on feathers of rest of under-parts with dark shaft-streaks on breast, still darker examples have brown throat with dark brown shaft-streaks and rest of under-parts with white mostly obscured by broad dark brown bars or tips, while in some white is almost entirely obscured and whole



The Honey-Buzzard (*Pernis a. apivorus*).

under-parts are dark chocolate-brown with black shaft-streaks; *tail-feathers* brown, narrowly tipped white or brownish-white, with broad black-brown subterminal band and two or three less broad bands on proximal half, brown interspaces with more or less distinct narrow, closely set, wavy, dark brown bars more conspicuous on distal half of feathers, bases of feathers with more or less white: appearance of tail from underneath grey with broad brown bands; *wing-feathers* brown narrowly tipped white and basal portions of inner webs white, wide subterminal blackish-brown band and widely spaced similar, but narrower, bands on remaining portion of feathers (outer primaries with long black-brown tips and with white more extensive on inner webs); *primary-* and *greater coverts* as wing-feathers; *median* and *lesser coverts* as mantle. *N.B.*—Variations are individual and not connected with sex, age, or season. This plumage is acquired by complete moult commencing in July (perhaps June) sometimes complete by September, often not until Dec. and even March or April.

NESTLING.—At first *down* (A) long on crown and neck and fairly long on upper-parts with silky hair-like tips, shorter on under-parts. Crown and neck cream-coloured, rest of upper-parts pale buffish-grey, under-parts white. Very short tufts here and there of *down* (B). Later *down* (C) (replacing *down* (B) as in Peregrine, see pp. 13-14) coarser, more woolly, thick but not very long and white.

JUVENILE.—*Upper-parts* like adult but feathers of crown and hind-neck with pale buff or creamy-white tips sometimes very small, sometimes so large as to make crown mostly creamy-white (rarely crown entirely white); some feathers of mantle and scapulars sometimes with white tips; *under-parts* varying: paler examples cream to white, feathers with brown to blackish shaft-streaks and more or less brown centres giving a somewhat streaked appearance, and not barred as in adult except on lower flanks and belly where there are large brown spots or incomplete bars: dark examples almost uniform brown on under-parts, feathers with blackish shafts, lower flanks, vent and under tail-coverts indistinctly barred creamy-buff; *wing-* and *tail-feathers* with longer white tips than in adult; *wing-coverts* often with white or pale buff tips, but as often these are not present.

FIRST WINTER.—Like juvenile.

FIRST SUMMER.—The juvenile plumage is completely moulted from May or June onwards and bird then becomes like adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 375–425 mm., tail 210–260, tarsus 53–60, bill from cere 21–23 (12 measured). ♀ wing 395–425. Primaries (1st vestigial one not included): 1st equal to or a little shorter or longer than 7th, 3rd longest, 4th often as long, sometimes 5–10 mm. shorter, 2nd 15–30 shorter, 5th 10–25 shorter, 6th 40–65 shorter; 2nd to 5th, and 6th less distinctly, emarginated outer webs and 1st to 5th inner webs. Tail slightly rounded laterally, 12 feathers, tips rounded. About half tarsus feathered in front. Toes and claws long and slender, latter very sharply pointed but not very much curved. Bill rather broad at base and cere long, upper mandible curved, tip slender and sharply pointed, lower mandible shallow, rounded and point rounded. Nostrils bare, slit-like and oblique. Lores and round eyes compactly covered with short, rounded feathers. No bristles or bristle-like feathers.

SOFT PARTS.—Bill black, base of lower mandible grey; cere upper-part blackish, lower yellow; legs and feet and iris yellow, iris in any case in some juveniles dark smoke-brown. *H.F.W.*

**Characters and allied forms.**—Lores covered with rounded feathers (not bristles) distinguishes Honey-Buzzard at a glance from other British "hawks." *P. a. orientalis* (E. Siberia, Japan) is larger. *H.F.W.*

## Genus GYPS Sav.

GYPS Savigny, Descr. Egypte, Zool., Syst. Ois., i, pp. 68, 71 (1809—Monotype: *Gyps vulgaris=fulvus*).

Head and long neck without feathers, more or less covered with short woolly down, a well-marked ruff at base of neck. Bill very high, cere shorter than tip. Nostrils perpendicular or oblique slits. Tail rounded, 14 rectrices. Four species, S. Europe, Africa, and Asia. Eggs white, not definitely tinted internally.

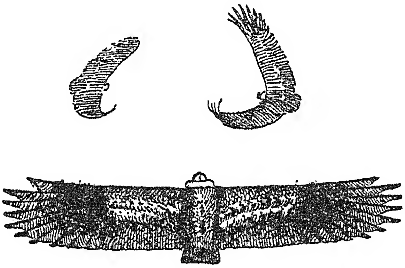
*PLATE 72.*

## 282. THE GRIFFON-VULTURE—Gyps fulvus fulvus (Hablizl)

VULTUR FULVUS Hablizl, Neue Nordische Beytraege, iv, p. 58 (1783—Mts. of Gilan, N. Persia).
*Gyps fulvus* (J. F. Gmelin), Yarrell, i, p. 1 ; Saunders, p. 311.
*Gyps fulvus fulvus* (Hablizl), Pract. Handb., ii, p. 182.

**Habitat.**—Frequents open country principally in mountainous districts, since it generally breeds in high crags, but ranging widely over lowlands where local conditions assure it of a food supply. *B.W.T.*

**Field-characters and General Habits.**—When settled Griffon-Vulture, with its ugly featherless head, is not prepossessing, though not altogether unimposing from sheer size, but on wing is a most majestic bird, as it planes over a hillside with easy sweeping flight, with now and again a single leisurely but powerful downward stroke through a wide arc, or soars on rigid wings in wide circles, often at a great height. *Very broad wings with front and hind borders approximately parallel for nearly whole length and abruptly rounded off at ends, with head and short broad tail projecting only a little beyond them* give roughly rectangular outline when soaring, which with *general sandy colour* (often looking extremely pale in strong sunlight) contrasted with *black wing-quills and tail* is quite characteristic. When seen in direct flight, however, and especially from side, wings often appear distinctly angled. At close quarters ruff round neck can be distinguished and widely spread primaries of soaring bird, curving upwards at tips from air pressure, contrast strongly with continuous border of rest of wing. Ruff is creamy-white in adults, brownish and composed of long pointed feathers in immatures. Length *c.* 38–41 ins. ; sexes appear not to differ in size.



The Griffon-Vulture (*G. fulvus*), as viewed from below.
(*From a diagrammatic sketch by* H. M. Wallis.)

Rather sociable in habits, several being often seen soaring together, but when a carcass has been sighted many more may be seen in the air. They spend much of their time circling high overhead on the look-out for food, and one carcass will draw birds from a wide area owing to each observing the movements of others within its range of view. In this way great numbers will congregate where species is common : *c.* 150 counted round one carcass in S. Spain (B.W.T.) and many more formerly recorded in Africa (*cf.* "several hundred" round dead camel in Egypt : G. E. Shelley), though nowadays it is not so numerous in N. Africa as in Spain. They crowd together in a jostling, scrambling mêlée on and round the carcass, while new arrivals plunge down with half-closed wings, sometimes in kind of spiral dive, to swell the gathering, and others already gorged sit about on neighbouring trees or on the ground reluctant to move. Hunched-up, high-shouldered attitude when at rest is characteristic shared with other vultures. On ground moves with clumsy waddling walk or run or in huge ungainly hops, aided by wings, when hurried. High crags or ledges of some huge cliff are used as social roosting-places and are also habitually resorted to as resting-places after heavy meal. In some places also roosts regularly, and in numbers, in trees (L. H. Irby). *B.W.T.*

**Voice.**—Often noisy at breeding-places, emitting weird grunts and lowing notes; a hissing noise is also occasionally heard at times of excitement as when young are endangered (F.C.R.J.). H. Kirke Swann described a long, harsh note uttered on wing when nest threatened and considered a hoarse croak " not infrequent " in flight at or near breeding-places, but in general it is very silent in air. *B.W.T.*

**Breeding.**—Usually breeds sociably, sometimes considerable numbers nesting close together, but also at times a solitary pair may be found. Normal site is on ledge in face of cliff, or in cave or recess among rocks. In a few cases has been found breeding in a large nest in a tree and said to have nested on ground near top of a hill in Spain (A. C. Stark). *Nest.*—When placed on cliffs it is often of the scantiest description, being merely a collection of bits of palmetto husks, a few sticks or twigs and grass, both sexes taking part in the work. Probably the large tree-nests were originally built by some other species. *Egg.*—Normally one only, though cases are said to have occurred where two eggs or young have been found. On cliff ledges nests are sometimes close together, so that unless personally observed, mistakes may easily occur. Colour usually white: in rare cases a few spots or smears of darkish red may be met with. Average of 60 Spanish eggs, 92×70·1. Max.: 101·2×73·8 and 94×75. Min.: 81·5×65 and 85×64·5 mm. *Breeding-season.*—Begins late January; most eggs laid February, and second layings if first egg is taken about April. *Incubation.*—In confinement both sexes brooded in turns of about 2 days (O. Heinroth): F. Cerva says by female alone: male close by. Period 51–52 days (Heinroth): Cerva's estimate is 48 days. *Fledging.*—Young fed by disgorging half-digested carrion from crop, so that food is not left lying about nest, and except for smell of excrement, breeding-places are not offensive. Young said to remain three months in nest. Single-brooded. *F.C.R.J.*

**Food.**—Carrion of all kinds: in the case of large animals, such as horses, cattle or camel, after delay for some time till putrefaction has set in: also placenta of ewes, etc. *F.C.R.J.*

**Distribution.**—*Ireland.*—One, a young bird caught alive near Cork Harbour, spring, 1843. One seen near Southampton Water (Saunders, p. 311). Two seen Ashbourne, Derby, June 4, 1927 (H. H. Hollick and E. A. Sadler, *Brit. B.*, xxi, pp. 96–7). *H.F.W.*

**Distribution Abroad.**—Resident in S. Palæarctic, Ethiopian, and Oriental regions. In Europe north to Cantabrian Mts. and Pyrenees, Tarn gorges in S. France, N. Italy (rare), Yugo-Slavia, Albania, Romania, S. Russia (Podolia rare, Crimea and S. Urals). Also Transcaspia, Kizil-Kum, Turkestan, Tarbagatai, and Afghanistan. In south to N. Sahara, Marocco, Algeria, Tunisia, Tripoli, Egypt, Nubia, Sinai, Palestine, Syria, Persia to Baluchistan. Also in Sardinia, Sicily, Crete, Cyprus. Replaced by allied races in India (*G. f. fulvescens*) and in S. Africa (*G. f. coprotheres*). Has occurred in N. France, Holland, Belgium, Germany, Denmark, Baltic states, Finland, Poland, E. Russia (Perm Govt.), Hungary, Czecho-Slovakia, Austria, Switzerland, S. Russia, and Corsica : also in winter in Iraq and Arabia. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—*Head* and *throat* creamy-white, covered with longish fine bristle-like feathers and back of neck with short down ; (*upper-parts*) at base of back of neck a *ruff* of creamy-white feathers of very loose structure having long rami and very short or no radii ; mantle varying pale yellow-brown or sandy-brown to dark brown with varying amount of grey tinge ; scapulars same but longer feathers only tipped and edged pale and rest of feathers black-brown ; feathers of rump slightly darker than mantle and with pale shaft-streaks and small pale tips ; upper tail-coverts as mantle with dark brown basal portions ; (*under-parts*) from base of throat and covering whole crop-region feathers are very short and narrow and lie so flat and close that this patch appears like hair, colour buffish-brown to dark brown or dark reddish-brown with fine paler streaks, this patch encircled by white under-down ; rest of under-parts including axillaries and under wing-coverts varying pinkish sandy-brown to darker rufous-brown (often with a slight greyish tinge), feathers usually with narrow paler shaft-streaks, lower series of under wing-coverts dull white with a pair of large oval dark brown spots ; *tail-feathers* black ; *primaries* black, basal unemarginated portions edged greyish-brown, *secondaries* browner black and outer webs grey-brown ; *primary-coverts* as secondaries ; *greater coverts* black-brown, fringed and tipped pale sandy-brown ; *lesser* and *median coverts* like mantle. Thick white under-down of woolly appearance. This plumage is acquired by complete moult apparently commencing in April and most active in May and June, but period seems variable.

NESTLING.—At first down on head and neck very short and white, replaced by longer white down when *down* (A) on rest of body is being replaced by feathers. Not determined whether first down on head and neck is *down* (A) or *down* (B). Rest of upper-parts longer, *down* (A) pale grey with buffish tinge on wings and tail, under-parts paler grey, middle of breast and belly and patches at sides of base of neck bare. Later whole body thickly covered with rather longer and much coarser and woolly, creamy-white *down* (C). A very few tufts here and there of short *down* (B) are to be found on tips of *down* (C) (see Peregrine, pp. 13-14).

JUVENILE.—Like adult but *crown* covered with short down not long and bristle-like ; feathers of *ruff* very long, narrow and pointed (lanceolate) with short rami and not loosely constructed as in adult and with pinkish-brown edges and wide sandy-coloured shaft-streaks ; *upper-parts* darker and more pinkish than in adult (not so sandy) and feathers with narrow pale shaft-streaks especially noticeable on *wing-coverts ; under-parts* more pinkish than in adult and with more conspicuous pale shaft-streaks.

FIRST WINTER AND SUMMER.—The juvenile plumage is completely moulted apparently when bird is about a year old, but as birds examined have been found moulting at all times of year, period is uncertain. New plumage appears to be exactly as juvenile, but darker on upper-parts.

SUBSEQUENT PLUMAGES.—Owing to the similarity of the plumages it is difficult to trace sequence with certainty, but at second moult down on *crown* becomes more bristle-like though not so long as in adult. Rest of plumage apparently as before. At what appears to be third moult *crown* is covered with bristle-like down as in adult, much of *ruff* is as adult but there are interspersed a certain number of long pointed feathers as in young but with longer rami and more loosely constructed and creamy-white with brownish edges ; rest of plumage as adult. Probably at next moult (*i.e.* when bird is about four years old) it becomes like adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 70–76 cm. (one juv. 65) (measured with tape, see vol. i, p. xxxiv), tail 280–325 mm., tarsus 105–125, bill from cere 52–55 (14 measured). ♀ wing 70–76 cm. Primaries (1st vestigial one not included): 3rd, 4th, and 5th about equal and longest but varying up to 10 mm. and 5th usually shortest, 2nd sometimes as long but usually 10–20 shorter, 6th 20–40 shorter, 1st 70–90 shorter; 2nd to 7th emarginated on outer and 1st to 6th on inner webs. Tail nearly square, 14 feathers, tips rather square. About one-third of front of tarsus covered with woolly down. Middle toe much longer than others, claws not greatly curved and not sharp. Bill, upper mandible very high and much compressed with short, decurved, pointed tip, under mandible shallow and rounded with rounded tip. Nostrils bare, and slit-like, placed nearly perpendicularly.

SOFT PARTS.—Bill horn-colour, tip and cere darker and more slate-colour; legs and feet grey; iris brown to golden-brown. *H.F.W.*

**Characters and allied forms.**—Down-covered head and neck, ruff and very large size distinguish Griffon-Vulture from other British birds. *G. f. fulvescens* (India) is paler. *H.F.W.*

## Genus NEOPHRON Sav.

NEOPHRON Savigny, Descr. Egypte, Zool., Syst. Ois., i, pp. 68, 75 (1809—Monotype: *N. percnopterus*).

Fore-head to middle of crown, sides of head and throat without feathers, but with a few bristles, neck surrounded by a full ruff of hackles, extending up to hinder part of crown. On crop a large bare patch, under which a bunch of down. Bill slender, cere as long as tip, nostrils elongate and horizontal. Wings long and pointed. Tail wedge-shaped, 14 rectrices. Outer and middle toes united at base by membrane. Eggs beautifully marked with red-brown, not tinted internally. One species, two or three subspecies. S. Europe, Africa, western Asia to India.

*PLATE 71.*

### 283. THE EGYPTIAN VULTURE—Neophron percnopterus percnopterus (L.)

VULTUR PERENOPTERUS (evident misprint for *Percnopterus*) Linnæus, Syst. Nat., ed. x, i, p. 87 (1758—Egypt).
*Neophron percnopterus* (Linnæus), Yarrell, i, p. 6; Saunders, p. 313.
*Neophron percnopterus percnopterus* (L.), Pract. Handb., ii, p. 185.

**Habitat.**—Chiefly mountainous and hilly districts, but ranging widely over lowlands and in more primitive countries often numerous about towns and villages. *B.W.T.*

**Field-characters and General Habits.**—Bold contrast of *white plumage and black quills* of adult precludes confusion with any other bird-of-prey, but at long range can quite easily be confused with White Stork. With glasses, however, long neck and legs both extended in flight at once distinguish Stork. Immature birds are dark brown mottled buff, pale grey-brown, or dirty, creamy-white mottled brown according to age. In soaring has regular vulture outline (see under Griffon-Vulture) and widely spread primaries, but *size, longer and wedge-shaped tail* (a distinctive feature at all ages) and relatively narrower wings coming more to a point prevent even the brown young being confused with the larger species. Beak rather slender and weak, bare skin of face and throat yellow in adult, framed in kind of hood of long pointed feathers. Head of young greyish-brown. Length *c.* 23–25 ins. Not usually sociable like Griffon, but generally met with singly or in pairs, soaring with rigid wings, though half-a-dozen or more may gather round garbage or carrion ; seventeen once counted (F.C.R.J.).

Flight much as Griffon-Vulture, heavy and flapping when rising from ground, but once under way planes along with rarely any active wing movement, except at times single very deep downward flap, for which there seems little necessity, a trick shared by vultures with some other large birds-of-prey ; often soars at great height. Though more of a garbage eater than the larger vultures, no sort of filth coming amiss to it, it also regularly descends to clear up the scraps of carcasses which the Griffons have finished, and sometimes joins them while still feeding, running in to seize a bit whenever there is a chance. Walks with long strides and body tilting from side to side, and can even run. Perches on trees, crags, buildings, etc., and like Griffon usually roosts in rocks, but sometimes in trees ; L. H. Irby records about twenty roosting regularly in cork-oaks. *B.W.T.*

The Egyptian Vulture (*N. percnopterus*).
Appearance of adult in flight : Left-hand figure from below ; Right-hand figure from above.
(*From a diagrammatic sketch by* H. M. Wallis.)

**Voice.**—A very silent bird. Note of present race does not appear to have been described, but according to E. C. S. Baker usual note of Indian form (*N. p. ginginianus*) is a disagreeable whining mew, and it gives vent to hisses and low grunts when angry. *B.W.T.*

**Breeding.**—Usually nests in small caves or recesses in cliffs, often quite low, but sometimes at considerable height. Has also been recorded as occupying large nest in tree, which may have been an old one of another species. Formerly bred on buildings in Turkish towns, but now less commonly, but still does so in India. *Nest.*—Variable in size, as same site may be used for many years, and where room is sufficient, may gradually become very bulky. Apparently both sexes take part in construction : all kinds of material used, sticks, twigs, palmetto, bones, remains of dead animals of all kinds, rags, paper, dung ; lined goat's hair, wool, and bits of rag. *Eggs.*—Normally 2, occasionally 1 only, and very rarely 3 recorded, laid at intervals of several days, usually 3 or 4 or perhaps more. Colour dirty white, sometimes almost unmarked or with few red spots, but more often clouded and washed with some shade of red or brown, varying from light sienna to deep chocolate, with white ground showing in some cases, while others are almost covered with pigment. Ashy shell-marks are also noticeable in some eggs. Average of 100 eggs (44 by Rey), 66·18×50. Max. : 76·4×51·7 and 68·1×56·1. Min. : 58·2×50 and 64×43 mm. *Breeding-season.*—Usually eggs laid between late March and April 25 in Europe. *Incubation.*—By both sexes (O. Reiser). Period said to be *ca.* 42 days. Evidently begins with first egg. *Fledging.*—No details. Single-brooded. *F.C.R.J.*

**Food.**—Carrion, garbage, and dead animals of any kind. Haunts refuse dumps in outskirts of towns. Vegetable refuse, decaying fruit (figs, etc.), and excrement also devoured. In nests may be found remains of mammals, such as dogs, foxes, cats and kittens, rabbits, hedgehog, etc., all evidently found dead; also tortoises, lizards (including many large green), snakes, frogs and toads, and young Griffon-Vulture, once (W. Verner). Only living animals recorded are picked up following the plough or small crustacea (*Apos*) from shallow water. *F.C.R.J.*

**Distribution.**—*England.*—Two obtained and one stated seen. Immature bird shot (another said to have been in company but this disputed, see J. H. Gurney, *Zool.*, 1876, p. 5000) near Kilve, Bridgwater Bay (Somerset), Oct., 1825. Immature bird obtained Peldon (Essex), Sept. 28, 1868 (*ut supra*). *H.F.W.*

**Distribution Abroad.**—Mediterranean sub-region (S.W. Palæarctic), W. Oriental and Ethiopian regions. In Europe, north to Iberian peninsula, S. France (local), formerly Switzerland, Italy, Yugo-Slavia, Albania, Romania, and S. Russia to Caucasus. Also in Asia from Transcaspia, Kizil-Kum and Turkestan to Afghanistan and N.W. India. In south to Cape Verde Is., Canaries, Sahara, Marocco, Algeria, Tunisia, Cirenaica, Egypt, Nubia, and E. side of Africa to Cape Prov., Sinai, Arabia, Persian Gulf and Baluchistan, as well as Mediterranean Is. (Balearic Is., Sicily, Rhodes, Crete ?). Replaced by an allied race (*N. p. ginginianus*) in India and Ceylon. Accidental in Denmark, Germany, Austria, Switzerland (formerly bred), N. France, Sardinia, Malta, Madeira, Azores, and Orenburg Govt. also recorded. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Head*) chin, throat and crown to back of crown and ear, and a patch in middle of upper-breast bare yellow skin with a few short white plumules on chin, throat and fore-part of head, but back of crown more thickly covered with plumules and short degenerate feathers; (*ruff*) nape and extending round sides of base of neck dark cream to pinkish-buff, feathers elongated, very narrow and pointed (lanceolate) forming a sort of *ruff*; whole of rest of *body-feathers*, upper and under *wing-coverts*, and *tail-feathers* white tinged cream which is darkest and richest on mantle, scapulars, and upper-breast where sometimes with strong pinkish-buff tinge; *primaries* black, outer webs and inner portions of inner webs brownish-grey except at tips, outer webs of inner primaries narrowly edged paler grey, *secondaries* with distal halves of outer webs pale grey and basal part, tips and inner webs brownish or black, innermost feathers with both webs grey; *primary-coverts* black; innermost *greater coverts* brown-black; all rest of *coverts* as body. This plumage is acquired by complete moult from May to Dec. or Jan.

NESTLING.—Newly hatched bird, down white (C. Ingram).

JUVENILE.—(*Head*) fore-head, lores, round eyes, cheeks, and chin bare skin with some short tufts of black plumules especially on chin, throat and top of crown much more thickly covered than in adult with short creamy plumules, interspersed with short black feathers; feathers of *neck-ruff* shorter than in adult and brown-black tipped buff; (*upper-parts*) upper-mantle brown-black tipped buff; lower-mantle and scapulars browner and with longer buff tips which often entirely conceal brown; back, rump, and upper tail-coverts mostly buff, bases of feathers being pale brown; whole *under-parts* black-brown, feathers with buff tips of varying length but under tail-coverts as upper tail-coverts buff with pale brown bases; *tail-feathers* greyish-brown with long buff tips; *wing-feathers* much as in adult but outer webs of *inner primaries* and *secondaries* more grey-brown and not so pale grey, and innermost feathers with buff tips; *primary-coverts* black; *greater* and *lesser coverts* black-brown with shortish buff tips and median coverts with much longer buff tips.

FIRST WINTER.—Like juvenile. FIRST SUMMER AND SECOND WINTER.—The juvenile body-plumage sometimes commences to moult in March but wings and tail not until later. New plumage like juvenile but *upper-* and *under-parts* and *wing-coverts* brown-black with faint greyish tinge and feathers with only very small buff tips, here and there on *under-parts* a dull white feather and on *wing-coverts* a few with pale greyish inner webs or tips; outer webs of new *inner primaries* and *secondaries* paler grey than in juvenile and *tail-feathers* grey-brown washed grey and with only short buff tips.

SECOND SUMMER AND THIRD WINTER.—A few feathers of *ruff* greyish-white or partially grey; *upper-parts* and *under-parts* pale grey-brown, feathers with creamy or whitish tips, scapulars especially with considerable amount of grey wash, some greyish-white feathers here and there on upper-parts, but more of these on under-parts and *wing-coverts; tail* paler grey-brown and more washed grey than in first summer.

THIRD SUMMER AND FOURTH WINTER.—Mostly dull brownish-white with a certain amount of pale brown especially at bases of feathers and on scapulars and inner webs of *tail-feathers*, and shafts usually darker brown; *greater wing-coverts* mostly pale brown.

FOURTH SUMMER AND FIFTH WINTER.—Like adult but grey-brown on inner *greater wing-coverts*; long scapulars sometimes pale brownish-grey with dark shafts; a few other feathers here and there with some greyish-brown on shafts or webs. After this plumage is moulted, *i.e.* in fifth summer (five years old), bird appears to become adult, but sequence described above owing to small number of moulting specimens available must be considered as only approximate.

MEASUREMENTS AND STRUCTURE.—♂ wing 470–520 mm., tail 220–260, tarsus 75–88, bill from cere 31–34 (14 measured). ♀ wing 460–510. Primaries (1st vestigial one not included): 2nd to 4th about equal and longest, but one of them often 5–15 mm. longer than others, 1st 50–70 shorter, 5th 15–30 shorter, 6th 70–80 shorter; 2nd to 6th emarginated outer and 1st to 5th inner webs. Tail much rounded, wedge-shaped, 14 feathers, tips rounded. About a quarter of tarsus feathered in front. Middle toe much longer than others, claws strong, curved and fairly sharp. Bill slender (cere thickened at base), upper mandible curved and pointed, lower shorter and rounded. Nostrils bare, oval, horizontal.

SOFT PARTS.—Bill dark brownish-horn (juv. paler), tip black; cere, bare skin on head and breast yellow (juv. livid grey); legs and feet greyish-white to pale flesh or pale yellow; iris brown to reddish-brown or dark orange. *H.F.W.*

**Characters and allied forms.**—Bare head, ruff, wedge-shaped tail, and black and white colour (brown in young) distinguish species. *N. p. ginginianus* (India) has rather smaller bill, legs and feet, and yellow bill. *H.F.W.*

## Family PANDIONIDÆ.

Osprey differs in many ways from all other hawks and by some earlier workers (*e.g.* Gadow) was given family rank. More recent authorities (Wetmore, Stresemann) have not generally regarded it as deserving separation. Quite recently, however, it has been shown by L. V. Compton (*University of California Publications in Zoology*, vol. xlii, No. 3, pp. 173-212, 1938) that the Osprey agrees in its pterylosis and in the arrangement of the plantar tendons with the New World Vultures (sub-order Cathartæ) and differs entirely from the *Accipitridæ*. His conclusion is that it should be transferred to the Cathartæ, with which it also shows other resemblances. We are not satisfied that such a drastic change is justified by the facts, since in other features *Pandion* agrees with the members of the sub-order Falcones and differs from the Cathartæ, *e.g.* syrinx, feathered oil-gland, cæca, palatal structure, and pending a re-investigation of the whole anatomy we prefer to regard it as an isolated type of the Falcones preserving primitive characters which the Cathartæ also retain. It seems quite clear, however, that it cannot now be included in the same family as the ordinary hawks, and we therefore recognize a family *Pandionidæ*, which may be defined as follows. Pterylosis and arrangement of plantar tendons agreeing with Cathartæ, but otherwise conforming to definition of the sub-order Falcones (p. 1). Outer toe reversible as in owls. 15 cervical vertebræ. Prefrontal bone without orbital process. Aftershaft present on feathers of interscapular region, rump, and region round vent, otherwise absent. Plumage hard and close, feathers of lower part of tibia, unlike most other hawks, not elongated. Nostrils narrow, oblique, free. Wings long, pointed, 3rd visible primary longest, 2nd very little shorter, 4th slightly more so. Tail barely half length of wing. Tarsus short, strong, longer than middle toe without claw, entirely reticulated, without scutes. Toes and claws very powerful, toes with sharp, prickly scales beneath, adapted to capturing fish. Eggs heavily blotched chocolate, not tinted internally.

### Genus **PANDION** Sav.

PANDION Savigny, Descr. Egypte, Zool., Syst. Ois., i, pp. 69, 95 (1809—Monotype: *Pandion fluvialis* = *P. haliætus*).

With characters of family. One species divided in three subspecies.

*PLATES 71 and 72.*

## 284. THE OSPREY—Pandion haliætus haliætus (L.)

FALCO HALIÆTUS Linnæus, Syst. Nat., ed. x, i, p. 91 (1758—Europe. Restricted typical locality: Sweden).
*Pandion haliætus* (Linnæus), Yarrell, i, p. 30; Saunders, p. 359.
*Pandion haliætus haliætus* (L.), Pract. Handb., ii, p. 178.

**Habitat.**—Always frequents neighbourhood of water. In breeding-season confined inland to lakes, meres or rivers in neighbourhood of woods and on coast mainly to districts with suitable cliffs for nesting, though it also breeds freely in some areas (*e.g.* Red Sea, Mediterranean, etc.) on flat sandy coasts and small rocky islets; at other periods ranging more widely over coastal and fresh waters. *B.W.T.*

**Field-characters and General Habits.**—Constant association with water and *contrast of dark brown upper-parts with white under-parts and whitish head with broad dark band on side* are characteristic of Osprey. Wings long and narrow, distinctly angled in ordinary flight; tips of outer primaries blackish, rest of quills narrowly barred dark brown and white, remainder of under-wing whitish except for dark mark on front border in carpal region and generally a broken but more or less distinct dark band following base of quills. Tail of medium length, rather narrow. A light brown pectoral band. Feathers of back of crown somewhat elongated as kind of crest. Immature birds with light tips to feathers of upper-parts, pectoral band narrower and less distinct. Length *c.* 20–23 ins., female averages rather larger than male.

In fishing usually flies 30–100 ft. above water with alternate flapping and gliding. On sighting fish generally hovers for a moment (5–20 secs.: R. Meinertzhagen), with legs dropped and ends of wings strongly decurved, and plunges with half-closed wings, throwing up shower of spray and sometimes completely submerging for a second or two. On rising shakes water from plumage with convulsive quiver during which some elevation is lost. Fish is carried head foremost, gripped by both feet unless quite small. C. G. Abbott in observations on American race showed that in settling hinder foot is disengaged from fish and brought forward to grasp perch. Sometimes snatches fish from surface without preliminary hover and plunge. Has been observed to rip up fish and strip out backbone before starting meal (M. Barclay), but this is not always or even usually done. After feeding often flaps along surface dragging feet in water to rid them of slime, and has been observed to duck head under water as well. As perch likes dead or bare bough of tree or a post in the water ; also rocks. In soaring wings are less flexed than in ordinary flight, but more so than in Buzzard, etc. Though American form is strikingly gregarious at suitable breeding-places, present race is not so to anything like the same extent. It does, however, show tendency to social breeding in some districts (see under " Breeding "). *B.W.T.*

**Voice.**—Ordinary note, also of mild alarm at nest, is short, shrill musical whistle repeated a number of times, tending to drop in pitch towards end of sequence " tchip-tchip-tchip - - -" or " tcheep-tcheep-tcheep - - -" etc. More definite alarm note is a repeated " kyick-kyick-kyick - - -," with variants, interspersed when excitement is rising with a toneless " krrrk, krrrk " (Fr. Peus). C. G. Abbott's rendering of alarm-notes (in American form) is " ' Chick, chick, chick, cheek, cheek, ch-cheek, ch-cheek, cheereek, chezeek, cheezeek ' gradually increasing to a frenzy " or " ' tseep, tseep, tseep-whick, whick, whick-ick-ick-ck-ck ' dying away in a mere hiccough " and many other variations occur. A note heard when carrying fish, " kyeek, kyeek, kyeek - - -" or " *züik*, *züik-züik* - - -," and another " *pü*lick, *pü*lick, *pü*lick " (Peus) appear to be the " feesh, feesh, feesh " and " killy, killy, killy " of some other authors. A soft greeting note sounding like " chirrup " and various feeble cheeping notes described in American race are doubtless really common to the species. *B.W.T.*

**Display and Posturing.**—In display (presumed) male rises steeply upwards with quick beats of wings until finally it is poised for a moment with body almost vertical and rapidly beating wings curved noticeably forwards, then tilts forward and shoots down with half-closed wings and fanned tail for about 30 ft., rises again and repeats the manœuvre, and may continue without break for as much as 9 mins. (E. Hesse, Fr. Peus). Ordinary soaring and aerial pursuits are also frequent. Coition takes place on branch of tree or nest, male balancing himself on female's back by waving wings. *F.C.R.J. & B.W.T.*

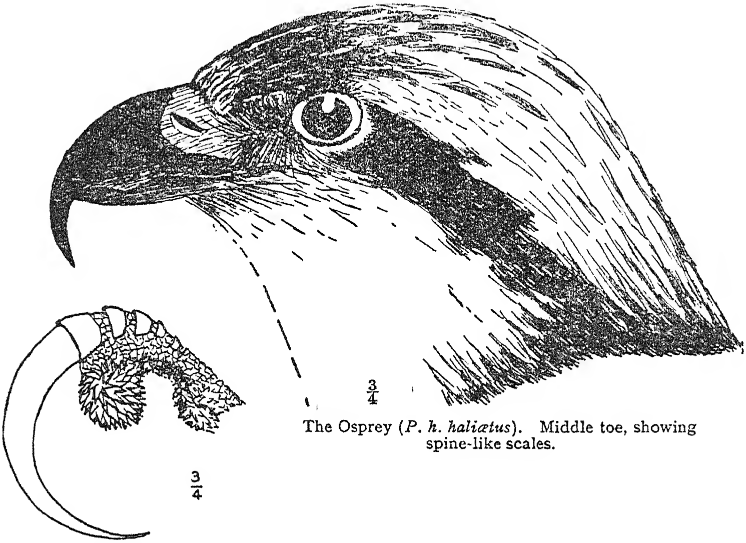
**Breeding.**—In Scotland most nesting-sites were on small rocky islets in lochs : in two cases on ruined buildings, while the rest were built in pines either on islands or on shores of lochs. Abroad sites vary a good deal : some birds nest on ledges of cliffs, at times in quite inaccessible positions : others breed on large or quite small trees or even bushes, on bare sandy flats, or in rocks of varying size, but always in or close to fresh or salt water. European race shows tendency to sociable breeding : in Germany locally nests only quarter of a mile apart (Fr. Peus) : in Red Sea, colony of 5 pairs on quite small island : some nests only 60–70 yards apart (H. Lynes). *Nest.*—Often of considerable size, being occupied for many years : materials vary according to locality : branches of trees and sticks where available, heather stems, seaweed, dead vegetable matter, bones, moss, driftwood, and almost any kind of material within reach : cup generally lined with grasses and finer material, with a feather or two. Both sexes take part, male providing greater part and hen arranging. *Eggs.*—Usually 3, sometimes 2, and exceptionally 4: extremely handsome, being boldly blotched and spotted with deep chocolate or red-brown and ashy shell-marks on white ground. Others have the markings more evenly distributed, almost covering the ground: and sparingly marked sets also occur. Shape rather more elongated ovoid than those of most raptores. Average of 100 eggs (32 by E. Rey, 14 by J. Palmen), 61·59×46·37. Max.: 69×46 and 68·4×50·3. Min.: 50·4×41·3 and 55·2×40·2 mm. *Breeding-season.*—In Scotland last week in April and early May, but varies according to latitude: latter half of May and early June in Lapland: mid-March in the Mediterranean and January-February in Red Sea. *Incubation.*—Begins with first (R. Kuhk) or second egg (H. Siewert): mainly by hen, relieved by cock for short spells while feeding. Period 35 days. *Fledging.*—Male provides food, carried in feet to nest: hen feeds young from beak for about 6 weeks (Siewert), afterwards food thrown down in nest. In some cases hen leaves nest to take fish in air when passed by cock. In last stages both supply fish. Period 52 days (minimum, Kuhk): more usually 8 to 10 weeks. Single-brooded. *F.C.R.J.*

**Food.**—In Scotland during breeding-season almost entirely fish, varying according to locality: sea-trout, brown trout, bream, perch, roach, and carp definitely recorded. When pressed by hunger has been known to take chickens, and Coleoptera have been found in stomach. On Continent, in addition to staple diet of fish up to about 4 lb. in weight, has been known to take small mammals occasionally (*Myodes*, *Spermophilus*, as well as mice): also seen to take wounded Sandpiper (H. M. S. Blair): Jackdaws and wild duck recorded (H. Grote), remains of Coot and small duck seen at nest, perhaps wounded birds. Giglioli records Crustacea. Frogs occasionally taken. *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare but regular passage-migrant. Formerly summer-resident in a good many places in Scotland, but now extinct as breeding species. Last bred at Loch Arkaig in 1908 and single bird there until 1913; last bred at Loch an Eilein in 1899 and in 1901 and 1902 only a single bird, after these dates both these localities forsaken. There is evidence of breeding at Loch Luichart and elsewhere on occasions since, but we have not definite proof of this. In England regular but rare passage-migrant (Sept.-Oct. and Mar.-May, fairly often July-Aug., sometimes June, occasionally Nov.), occurring every year on some part of coasts or on inland waters, but most regularly Norfolk; migrants also recorded occasionally in Scotland and several times in last ten years in summer. Rarely Wales, only once O. Hebrides, and very rarely Orkneys, and Ireland (last co. Down, 1929). *H.F.W.*

**Distribution Abroad.**—Holarctic, Oriental, Australasian, and parts of N. Ethiopian regions. In Europe north to 70° in Norway, Sweden, N. Finland, N. Russia (Petchora). Also Siberia, Altai, Semipalatinsk, and Turkestan. South to Canaries, coasts of N. Africa (Marocco, Algeria, Tunisia), Egypt (Red Sea), S. Arabia, Persian Gulf, etc. In Mediterranean, Balearic Is., Corsica, Sardinia, Sicily. Replaced by allied races in N. America (*P. h. carolinensis*), Malaysia and Australia (*P. h. cristatus*). Migrates from N. Europe to tropical Africa: in Asia to India and Ceylon, and occurs (but does not breed) in France, Holland, Belgium. Accidental in Iceland, Færoes, Madeira, and Azores. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts,* middle and fore-part of crown black-brown, feathers with creamy-white edgings, middle of back of crown and middle of nape buff, feathers with dark brown shaft-streaks, sides of back of crown and sides of nape creamy-white with scarcely any streaks (feathers of back of crown and nape pointed and somewhat elongated) ; rest of upper-parts dark brown with purplish gloss, feathers with very narrow whitish or buffish tips ; (*sides of head*) feathers of lores bristle-like, black with short whitish tufts at base ; ear-coverts black-brown extending in a broad line down sides of neck ; (*under-parts*) chin and upper-throat white more or less finely streaked black-brown ; lower-throat and upper-breast pale brown sometimes tinged rusty forming broad pectoral band ; rest of under-parts white to creamy-white usually with a very few small rusty-brown spots here and there ; axillaries and inner under wing-coverts white with varying amount of rusty-buff markings and brown spots, outer under wing-coverts brown with whitish tips and lower feathers barred white or cream ; *tail-feathers* dark brown narrowly tipped buffish-white, shafts yellowish-brown, inner webs (except of central pair) broadly barred pale brown at tip and white for rest of length, and outer webs often with faintly marked pale brown bars ; *outer primaries* : tips and outer webs blackish, inner webs white mottled brown ; *inner primaries* and *secondaries* dark brown glossed purple, barred white on basal portions of inner webs, amount of white decreasing on inner secondaries ; *primary-coverts* blacker than rest of wing-coverts which are like upper-parts. *N.B.*—Whitish tips to feathers of upper-parts soon wear off, crown and nape become whiter and brown of upper-parts much paler by wear and fading and purple gloss is lost. This plumage is acquired by complete moult apparently of a very gradual nature and I have examined moulting birds taken in every month of the year.



The Osprey (*P. h. haliætus*). Middle toe, showing spine-like scales.

NESTLING.—Bird a few days old. Down short and dense. Head sandy-buff with paler streak on nape ; upper-parts smoky-brown mottled buff, with conspicuous sandy-buff dorsal streak ; smoky-brown patch in front and behind eye ; under-parts creamy-white (C. Ingram). Birds partially feathered are very thickly covered with down which appears to be same as *down* (C) in Peregrine (see pp. 13-14), very little *down* (A) is to be seen and this seems short and cream-coloured. In these older nestlings upper-parts are dark smoke-brown with a line of white down back from nape to tail and bases of rest of down white, throat and breast and outside of tibia brown, rest of under-parts whitish, but tips of down smoke-brown, giving a slightly speckled appearance.

JUVENILE.—Like adults but crown and nape usually more streaked, all feathers of *upper-parts* and *wing-coverts* as well as *primaries, secondaries*, and *tail* with broad white or buffish-white tips, brown pectoral band narrower than in adults and more mixed with white, *tail-feathers* with much longer white tips than in adult, central pair often with more or less obsolete pale brown bars and rest with much more well-defined bars on outer webs, these being on outer feathers often whitish-brown, bars on inner webs well defined.

FIRST WINTER AND SUMMER.—White tips of feathers of juvenile plumage soon become much worn down and not obvious. Juvenile body-plumage sometimes commences to moult in October but usually later, moult seems very gradual as in adults, and wings and tail do not moult until spring and moult is usually not complete until autumn (*i.e.* when bird is about one and a half years old). When this moult is complete bird so far as I can see is like adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 450–495 (one 510) mm., tail 185–220, tarsus 58–69, bill from cere 30–35 (12 measured). ♀ wing 470–510. Primaries (1st vestigial one not included): 1st equal to or 5–10 mm. longer or shorter than 5th, 3rd longest, 2nd 5–10 mm. shorter or sometimes as long, 4th 10–15 shorter, 5th 55–70 shorter; 2nd to 5th emarginated outer webs (emarginated portions very slightly serrated), 1st–4th abruptly emarginated and attenuated on inner webs. Outer secondaries shorter than 10th primary, inner ones becoming longer and longest about equal 7th primary, tips rather sharply rounded. Tail square, 12 feathers, tips rounded. Tarsus feathered in front a little below tarsal joint. Scales on back of tarsus and on sides of and under toes very rough and forming short spines. Claws long, curved, rather slender and very sharp, that of middle toe flattened on inner side. Bill rather broad at base, upper mandible curved and tapering to sharp point projecting much beyond lower mandible which is short, shallow, and with rounded tip. Nostrils oblong and bare. Short bristles round eyelids.

SOFT PARTS.—Bill black, base bluish; cere pale greyish-blue; legs and feet greenish-white; iris yellow. *H.F.W.*

**Characters and allied forms.**—White on head and under-parts and general structure easily distinguish Osprey. *P. h. cristatus* (Australia, etc.) has whiter head, *P. h. carolinensis* (N. and S. America) has very little brown on breast and is smaller, and other forms have been separated. *H.F.W.*

## Order CICONIIFORMES.

Consists of storks, ibises, spoonbills, herons, and flamingos, apart from tropical forms. They are typically more or less long-legged and (except flamingos) long-billed, marsh and wading birds, though a few tropical types have bills much widened and some have become adapted to life on dry ground. They are desmognathous and the basipterygoid processes are atrophied in the adult, though often still articulating with the pterygoids in young skulls. 16–20 cervical vertebræ. Sternum with one or two pairs of incisions and no spina interna. Cæca present, but nearly always minute. Only one pair of sterno-tracheal muscles. Diastataxic. Generally an aftershaft. Oil-gland feathered except in a few herons. Lower jaw truncated at back except in *Threskiornithidæ*.

Wetmore recognizes four sub-orders, Ciconiæ, Ardeæ, Balænicipites, and Phœnicopteri.

### Sub-order CICONIÆ.

Wetmore includes in this group the African Hammerhead (*Scopus*), constituting the family *Scapidæ*. This form is considered by Chalmers Mitchell

(*Proc. Zool. Soc.*, 1913, pp. 644-703) to be more allied to the storks than the herons, but in many ways it is intermediate and combines important characters of both. It also shows decided affinities with the Whale-headed Stork (*Balæniceps*), the sole representative of the sub-order Balænicipites. Its affinities with the storks are considered to be indicated especially by various features of pterylosis and a combination of minor osteological characters, but in several of the features which might otherwise be regarded as diagnostic of the Ciconiæ it resembles the herons. This makes a diagnosis of the Ciconiæ difficult if *Scopus* is to be included, and there seems a distinct case for adopting only two sub-orders of Ciconiiformes, Phœnicopteri and the rest, and recognizing only family divisions of the latter. An alternative might be to put *Scopus* with *Balæniceps* if the sub-orders are retained. However, as the treatment of *Scopus* is not of direct concern in Palæarctic ornithology, the question will not be debated here and we accept provisionally Wetmore's grouping, according to which Ciconiæ must be defined as follows: nidicolous Ciconiiformes with 16–18 cervical vertebræ, interorbital septum fully ossified, very small vomer, sternum with spina externa small or absent, syrinx variable, generally without intrinsic muscles, aftershaft variable, sometimes absent, tongue very small, and no powder-down; nearly always with simple hypotarsus (*i.e.* flexor tendons running in grooves on proximal end of "tarsus" instead of through bony bridges), hind toe above level of rest, fully feathered neck, and down on the feather tracts as well as between them (*Scopus* resembling the Ardeæ in the last four characters).

## Family CICONIIDÆ.

Storks and allies. Sternum with one incision on either side. 17–18 cervical vertebræ. No occipital fontanelles. Furculum meeting sternal keel, sometimes ankylosed with it in age. Tarsus reticulated. Claws blunt, not pectinated. Holorhinal, nares pervious, reduced. Two minute cæca. Syrinx variable, but generally tracheal; no intrinsic muscles. Ambiens feeble, rarely absent. Muscle formula AXY (occasionally XY). Pectoral muscle two-layered. Eleven functional primaries, the true first being vestigial (lost in *Anastomus*). 12 rectrices. Aftershaft short, absent in a few. Oil-gland with at least two openings on each side. Bill in Palæarctic forms long, strong, straight or slightly turned upwards, cuneiform. Long downward extension of pharyngo-nasal air-sac on neck. Cervical air-sacs divided by septa, as in Phœnicopteri. Rudimentary copulatory organ present, as in Phœnicopteri. Fly with neck extended (except *Leptoptilos*). Eggs white, unmarked. Young have two downy coats, the first of "prepennæ" (down formed in continuity with tips of future contour feathers), which is soon superseded by longer coat of "preplumulæ" (formed in continuity with future definitive down feathers). Over twenty species in both hemispheres.

### Genus CICONIA Brisson

CICONIA Brisson, Orn., i, p. 48 (1760—Type by tautonymy "*Ciconia*," *i.e. Ciconia ciconia*, *cf.* vol. v, p. 361).

Bill straight, nostrils a short horizontal slit. Part of lores and chin bare. Lower feathers of neck elongated. Tail slightly rounded, lower tail-coverts ordinary.

*PLATE 72.*

### 285. THE WHITE STORK—Ciconia ciconia ciconia (L.)

ARDEA CICONIA Linnæus, Syst. Nat., ed. x, i, p. 142 (1758—Restricted typical locality: Sweden).
*Ciconia alba* Bechstein, Yarrell, iv, p. 219; Saunders, p. 387.
*Ciconia ciconia ciconia* (L.), Pract. Handb., ii, p. 188.

**Habitat.**—Frequents chiefly open grasslands and marshy country, in breeding-season largely in vicinity of human habitations, from isolated farms to towns and villages, though also locally in marshy wooded districts far from human settlements. *B.W.T.*

**Field-characters and General Habits.**—*White plumage with black wing-quills and scapulars, long neck and long red bill and legs* make Stork easy to identify. Flies with rather slow, deliberate wing-beats and with legs and neck stretched out, but drooped a little below plane of body. Glides when about to pitch and also soars with rigid wings, when it can be confused at long range with Egyptian Vulture if long legs and neck are not distinguished. Young birds have black of wings browner and bill and legs brownish-red. Total length *c.* 40 ins.; body *c.* 21 ins.

Gait a sedate walk. Perches on trees, buildings, etc., often resting on one leg. Attitude of rest or sleep is with bill sunk in neck-feathers. Voluntarily associating with man for breeding purposes, Stork is usually trustful and almost "domesticated" at nesting places, but otherwise comparatively shy and wary. Though often seen singly is not unsociable; little groups may frequently be seen in the fields and a number may breed close together, while on migration and in winter-quarters it associates in large flocks, great numbers often assembling where locusts are present. During breeding-season immature birds of both sexes often associate in parties, sometimes of fifty or more where species is common, and these parties sometimes include sexually mature, non-breeding birds as well (H. Siewert). Fledged young return to nest to roost (Siewert). Indigestible matter (chitin of insects, plant remains swallowed with food, etc.) is ejected in pellets, but bones and fish scales digested (G. Niethammer). In consequence pellets are much more numerous and better developed in years of drought, when birds are mainly dependent on insect food, than in normal seasons when they can get plenty of fish, frogs, etc. (J. Schenk). For photograph of pellets, see Schenk, *Verh. d. VI Int. Orn.-Kong., Kopenhagen, 1926*, pl. XIII. *B.W.T.*

**Voice.**—Vocal powers are very feebly developed, place of voice being taken by well-known "bill-clattering" (see under "Display"). Only vocal notes of adults are a hiss which often precedes the clatter or expresses annoyance or pain, and a hoarse "che choo, che choo"[1] heard during coition (H. Siewert). Young, however, have quite loud mewing notes like young kittens, as well as grunting and cheeping sounds and a harsh hissing (O. Heinroth, Siewert). *B.W.T.*

**Display and Posturing.**—"Bill-clattering" is a rapid rhythmical clapping of mandibles, producing a loud almost trilling sound with peculiar modulations of pace and pitch. It is usually accompanied by singular movements, neck being curved backwards till crown touches back, then brought forward and downward again, then back; throat-pouch acts as resonator. (For photograph, see H. Siewert, *Störche*, pp. 136, 145, 187.) Is essentially expression of excitement and not only functions as greeting-ceremony at nest, but may be performed by one bird or by both when they have been some time together, or on approach of hostile Stork. Young clatter feebly as soon as hatched. In defensive or threatening posture (Siewert, *l.c.*, p. 183) wings are drooped, tail fanned and cocked up, neck somewhat extended, with bill pointing down and throat-sac swollen. Coition on nest, male springing on to female's back, adjusting balance by flapping movement of wings, then bending legs and lowering himself into requisite position with wings still spread and moving; at same time makes gentle clapping noises with bill amongst neck-feathers of female, whose head is drawn back so that crown rests against male's breast and bill touches his with gentle rubbing movement (Siewert, *l.c.*, pp. 147, 148). *F.C.R.J. & B.W.T.*

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[1] "Ch" guttural, as in "loch."

**Breeding.**—Breeds on buildings of all kinds, from mere huts and stacks a few feet high in Spain and N. Africa, to lofty buildings in towns and villages in Denmark and Germany. Also breeds on ruins of viaducts, in trees (sometimes up to a dozen old and new nests in a single tree), or on poles with basket or wheel at top erected for purpose. Nests on ground have been recorded. Where plentiful, up to 40 or 50 nests may be built within a very limited area, but solitary nests may also be found. *Nest.*—As same sites are used year after year and added to, nests become very bulky, built of good-sized branches and sticks, solidified with clumps of grass and earth, then small twigs, with a flattish cup, lined grass, stalks, moss, paper, rags and a few feathers. Both sexes bring material, one generally on guard, but male brings most and female arranges material. *Eggs.*—Generally 3–5, usually 4, but 1, 2, 6 and 7 on record. Some eggs (and also young) ejected from nest at times by parents. Colour chalky-white, sometimes with glossy surface, variable in shape: no markings except slight nest stains. Average of 103 eggs (44 by E. Rey), 73·2×51·81. Max.: 81·5×46·5 and 71·7×55·7. Min.: 65·6×49·6 and 81·5×46·5 mm. Average weight, 10·57 grams (8·57 to 13·55 gr., Rey). *Breeding-season.*—In Mediterranean region from end March and early April: in middle Europe latter half April to early May. *Incubation.*—Begins with 1st or 2nd egg, laid normally at 2 days interval, occasionally longer; by both sexes, female generally during night (*cf.* H. Siewert, *Störche*). Period, 29–30 days for each egg. *Fledging.*—Young fed by both sexes, parents shaking bill and regurgitating food on to nest, young picking up bits, while further supplies are disgorged as needed. Period 53–55 days, but young fed for fortnight or more after first flight (P. Skovgaard). Single-brooded in middle Europe. *F.C.R.J.*

**Food.**—Principally frogs (especially *Rana temporaria*) and tadpoles, but also newts, lizards, slow-worms, snakes, fish of various kinds, worms and leeches, as well as insects, chiefly Orthoptera (*Gryllotalpa*, locusts, grasshoppers, etc.). Odonata and larvæ, Coleoptera (especially water-beetles and cockchafers), etc. Mollusca (snails) are also taken, also some Crustacea, including the introduced mitten-crab: young and eggs of species of birds which nest on ground (*Alaudidæ*, *Motacillidæ*, etc.) and at times small mammals, such as field-mice, shrews, moles, young rabbits or very small hares. Young are fed on disgorged food in small pieces including some vegetable matter (bits of aquatic plants). In winter-quarters locusts largely eaten. Above records all from foreign sources. *F.C.R.J.*

**Distribution.**—*British Isles.*—Vagrant. A number Norfolk and Suffolk and others in various parts of southern half of England, but rarely in recent years and very rarely in north and west, a few Scotland as far north as Orkney, Fair Is. and Shetland, and three or four Ireland. Most March to June, but also autumn. One Sussex, Oct. 7, 1922, was ringed as nestling Denmark same year. Recorded as having nested on St. Giles, Edinburgh, in 1416. *H.F.W.*

**Distribution Abroad.**—A Palæarctic species. Typical race breeds in Europe north to N. Spain, E. France, Holland, Germany, Denmark, S. Sweden, E. Prussia, Baltic states, Poland, Romania, W. Russia to Pskov and east to Smolensk, Kaluga and Orel (rare), Kharkov, Ekaterinoslav and Taurida Govts., also Caucasia. In Asia in W. Persia and Iraq. Extends south to Mediterranean: also N.W. Africa (Marocco to N. Tunisia): also Asia Minor, Syria, but not Mediterranean Is., Italy or S. Greece. Replaced by allied races in Turkestan and Yarkand: E. Asia and Japan (*C. c. boyciana*). Typical race winters in S.W. Arabia to central and S. Africa, while Asiatic races winter in India and coasts of N.E. Asia. Has occurred in Norway, Finland, Belgium, Madeira and Canaries. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Whole plumage white except long scapulars, greater wing-coverts, primary-coverts, primaries and secondaries which are jet-black, extreme base of outer webs of primaries tinged grey, outer webs of secondaries especially outer feathers and when fresh tinged considerable amount of grey. Feathers of head and neck narrow and those of upper-breast very long and narrow. This plumage is acquired by complete moult, but insufficient material is available to determine period; birds examined in moult dated July, Sept., Jan. and Feb.

NESTLING.—Down at first, short, white and sparse. When bird is about a week old it is covered with longer white down, which also grows closely all over body where first down was absent.

JUVENILE.—Like adult but long scapulars and greater wing-coverts tinged brown especially at tips; inner median wing-coverts brown-black as greater; two or three short scapulars with brown-black to grey centres.

FIRST WINTER.—Like juvenile but moult sometimes commences Dec., period uncertain owing to want of material, but moult is complete and sometimes does not begin before May. After this moult bird appears to become like adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 53–63 cm. (measured with tape, see vol. i, p. xxxiv), tail 215–240 mm., tarsus 195–240, bill from feathers 150–190 (9 measured). ♀ wing 53–59 cm., bill 140–170 mm. Primaries (1st vestigial one not included): 4th longest, 3rd and 5th usually as long but sometimes 5–10 mm. shorter, 2nd occasionally as long, usually 10–30 shorter, 1st 50–90 shorter, 6th 15–60 shorter, 7th 95–135 shorter; 2nd to 6th emarginated on outer webs near base. Tail slightly rounded, nearly square, 12 feathers, tips rounded. Bill straight gradually tapering to point. Nostrils small and slit-like. Skin between lower mandibles and on sides of chin bare. No rictal or nasal bristles. Toes webbed at base and "soles" fleshy and spreading. Claws convex, rounded, nail-like.

SOFT PARTS.—Bill, legs and feet red; bare skin between lower mandibles, lores and round eyes black but on each side of chin red; iris grey. Juvenile: bill brownish-red with blackish tip; round eye dusky; legs and feet brownish-red; iris dull brown. Nestling (one week old): bill black-horn, tip brown; bare skin on chin black; feet whitish-flesh, tarsus same marked blackish; iris brown. *H.F.W.*

**Characters and allied forms.**—Large size, with black only on wings and scapulars, long red legs and bill distinguish Stork from other British birds. *C. c. asiatica* (Turkestan) appears to have a larger red bill, *C. c. boyciana* (Ussuria, Amur, Japan) has a much deeper and larger black bill and considerably more grey on outer webs of secondaries. *H.F.W.*

*PLATE 72.*

### 286. THE BLACK STORK—Ciconia nigra (L.)

ARDEA NIGRA Linnæus, Syst. Nat., ed. x, i, p. 142 (1758—North Europe).
*Ciconia nigra* (Linnæus), Yarrell, iv, p. 225; Saunders, p. 389; Pract. Handb., ii, p. 190.

**Habitat.**—In breeding-season frequents chiefly wooded country (often conifers) interspersed with marsh or marshy meadows. Sometimes, however, breeds in comparatively barren mountain country with scanty scrub. *B.W.T.*

**Field-characters and General Habits.**—Form, flight and carriage as White Stork, but *whole plumage black with beautiful purple and green gloss, except for white breast, belly and under tail-coverts.* Young are browner especially on head and neck. Total length *c.* 38 ins.; body *c.* 20 ins.

In contrast to White Stork is shy and generally solitary in habits, avoiding haunts of man, but gait, flight, etc., are similar. This appears to be also generally true in winter, though in India it is stated to occur in larger flocks than does White Stork in that country (E. C. S. Baker). According to R. Meinertzhagen it seems to prefer drier situations in winter-quarters than White Stork, but this is apparently only locally true and is not the case in summer, when it is more of a fish-eater than that species. *B.W.T.*

**Voice.**—In contrast to White Stork has well-developed vocal notes. Note "che lee, che lee,"[1] the "che" something like drawing air into open mouth, the "lee" clear and drawn-out, sometimes more like "hooyi"; on intrusion of another bird at nesting place, "fleeee, he fleeee, he fleeeeehe" (H. Siewert). Young have various notes. Heinroth describes heron-like chatter of young nestlings a sustained, whining "quieeeeeeeee" at *c.* 2 months and a hissing, wheezy "ooi, ooi, ooi - - -" when fledged. *B.W.T.*

**Display and Posturing.**—As greeting ceremony birds move neck up and down and from side to side with sinuous motion and spread white under tail-coverts conspicuously; they may also pick up twigs. Sometimes they walk round and round one another with under tail-coverts spread, bill sunk on neck and face taking on peculiar strained and expectant expression. In defensive or aggressive posture wings are slightly raised, under tail-coverts conspicuously spread, neck-feathers erected, and neck moved up and down in sinuous manner with bill pointing upward or swung from side to side (H. Siewert, *Störche*; *cf.* photographs on pp. 67, 68). Bill-clattering is much less developed and less regular than in White Stork (never seen by Siewert) and head movement associated with it in that species does not occur. F. E. Stoll found it associated with strong excitement, occurring in young and old when angry and in latter also when sexually excited. In young when irritated it was accompanied by drooping of wings, ruffling of neck and cheek feathers, distension of throat-sac and sinuous movements of neck, which was also sometimes suddenly stretched straight upwards. Essentially similar posture was used by male clattering in display to female. *F.C.R.J. & B.W.T.*

**Breeding.**—Usually breeds in deep forest but also recorded as nesting in cave on steep river-bank, and on face of cliff, etc. Not sociable, always breeding singly. *Nest.*—As old nests of previous year are generally reoccupied little addition is necessary. New nests much like those of White Stork, rather small and flat, built of sticks and solidified with earth and grass: by both sexes (male seen bringing material in bill): has characteristic lining of big lumps of soft green moss. Other observers record grass, dung, etc. Usually built in some large pine, oak, beech, etc., at 30 to 70 ft. from ground. *Eggs.*—3 to 5 but 4 commonest: blunt oval, white; in fresh condition appears green internally, while eggs of White Stork are yellowish, but colour fades with age. Average of 96 eggs, 65·56×48·72. Max.: 74·3×47·5 and 69·4×51·7. Min.: 61×48 and 60·3×45·2 mm. Average weight, 8·36 grams (7·9 to 8·8 gr., E. Rey). *Breeding-season.*—In middle Europe generally in last fortnight of April or early May, exceptionally a week earlier. *Incubation.*—Eggs laid at intervals of at least 2 days: incubation begins with 1st egg (O. Heinroth) or 2nd (H. Siewert); by both sexes, but chiefly by female, male relieving her for some hours in morning. Period variously estimated at 32–38 days (Hörring), 35–46 (P. Skovgaard). *Fledging.*—Young fed by both parents, one remaining on guard for first 1–2 weeks: food regurgitated from crop on to nest. Period: 63 days (in confinement, Heinroth): 69 and 71 days (Siewert). Single-brooded. (*Cf.* Siewert, *Störche.*) *F.C.R.J.*

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[1] "Ch" guttural as in "loch."

**Food.**—On the Continent records show that food is almost entirely animal matter: chiefly fish, including perch (*Perca*), rudd and roach (*Leuciscus*), loach (*Cobitis*), small eels and stickleback (*Gasterosteus*): also frogs (*Rana temporaria*) and tadpoles: less frequently lizards, snakes, newts, worms, leeches and insects (including Odonata and larvæ, Hemiptera (*Nepidæ* and larvæ), Coleoptera (especially water-beetles, larvæ of *Hydrophilus*, etc.)). Occasionally also small mammals (field-mice, shrews, moles and young hare) and some vegetable matter. *F.C.R.J.*

**Distribution.**—*England.*—Very rare vagrant. Over twenty recorded; Scilly Is. (2), Devon (1 and others seen), Somerset (1), Dorset (2), Kent (4), Middlesex (1), Oxon (1), Suffolk (4), Norfolk (3 and several seen, last June, 1924), Yorks (2), Durham (1). Has occurred all months from March to Nov., but chiefly May-June. *H.F.W.*

**Distribution Abroad.**—Locally in Palæarctic region: also reported in Ethiopian. Breeds in Europe in central Spain and S. Portugal, Germany, E. Prussia, Baltic states, Denmark, S. Sweden, Poland, Hungary, Czecho-Slovakia, Yugo-Slavia, Romania, Bulgaria, Russia (west to Volhynia, N. to about 60°, east to Perm and Ufa Govts., south to Kharkov, rarely Crimea, Caucasus). Also Asia Minor, Persia, Kirghiz Steppes, Turkestan, Siberia, Altai, Tarbagatai, N.-W. Mongolia and China. Has been recorded several times as breeding in S. Africa (*cf.* H. Grote, *Orn. Monatsb.*, 1932, p. 81, etc.). Winters in S. Africa, passing through Mediterranean region and S.-W. Asia. Occasional in France. Accidental in Norway, Finland, Heligoland, Holland, Belgium, Switzerland, Madeira and Japan. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Upper-breast, belly, under tail-coverts and axillaries white; rest of plumage black, glossed on sides of head and base of neck red-purple, on top of head, rest of neck, mantle and lesser wing-coverts purple and green, rest of upper-parts same but gloss less rich; upper tail-coverts and tail more brownish-black; feathers of neck and lower-throat longish but not so narrow as in White Stork. This plumage is acquired by complete moult in May and June and one example moulting body Nov., but material insufficient to determine extent of period.

NESTLING.—As in White Stork. Tufts of 1st down adhere to tips of feathers except primaries, secondaries and tail where down is absent (C. Ingram).

JUVENILE.—As adult but head, neck, throat and upper-breast brown, tips of feathers pale buffish-brown; upper-parts, wing-coverts and secondaries brown-black with much less green and purple gloss than in adult, and wing-coverts, scapulars and upper tail-coverts with slight pale tips.

FIRST WINTER AND SUMMER.—Becomes like adult apparently after first moult, but material is insufficient to say exactly when this takes place, but apparently between Feb. and Sept. in year following hatching.

MEASUREMENTS AND STRUCTURE.—♂ and ♀ wing 52–60 cm. (measured with tape), tail 190–240 mm., tarsus 180–200, bill from feathers 160–190 (9 measured, material insufficient for separate measurements of sexes). Primaries (1st vestigial one not included): 3rd, 4th and 5th longest, 1st 60–85 mm. shorter, 2nd 10–20 shorter, 6th 20–50 shorter, 7th 80–130 shorter; 2nd to 6th emarginated at base on outer webs. Rest of structure as in White Stork.

SOFT PARTS.—Adult: bill, bare skin on lores and round eye bright dark crimson, paler at tip of bill; legs and feet bright scarlet; iris brown; bill and legs become brownish in autumn (O. Heinroth). Nestling: bill yellow becoming greyish-green except at base at six weeks; legs and feet pale flesh becoming pale green in juvenile and beginning to redden in early February (Heinroth). Juvenile: round eye grey. *H.F.W.*

**Characters.**—No subspecies. Glossy " black " head, throat, neck and upper-parts and tail distinguish it from White Stork. *H.F.W.*

## Family THRESKIORNITHIDÆ.

Ibises, spoonbills and allies. A pair of openings or fontanelles in occipital region of skull. Sternum with two incisions on either side. Furculum not meeting sternal keel. Tarsus reticulated or with large transverse scutes in front. Claws pointed. Schizorhinal, nares pervious. Syrinx variable, with intrinsic muscles in some. Ambiens present. Muscle formula ABXY. Pectoral muscle not two-layered. Ten functional primaries, the true first being vestigial. 12 rectrices. Aftershaft present. Oil-gland with one or more openings on each side. Lower jaw with hooked process at back, not truncated as in other Ciconiiformes. Bill long, thin and decurved or flattened and spatulate at tip. Fly with neck extended. Eggs variable: white spotted and blotched brown, or blue, unmarked or spotted brown. Young with two downy coats as in storks. Over thirty forms in hot and temperate regions of both hemispheres.

### Genus PLATALEA L.

PLATALEA Linnæus, Syst. Nat., ed. x, i, p. 139 (1758—Type by subsequent designation, of Gray 1840, *Platalea leucorodia*).

At once recognizable by thin, flattened bill, which at tip is dilated in form of a spoon. Nostrils oblong, near together. Chin, lores, orbits, part of forehead bare. Tibia half bare. Second visible primary longest, third little shorter. Four species in S. Europe, Africa, Asia to Australia.

*PLATE 73.*

## 287. THE SPOONBILL—Platalea leucorodia leucorodia L.

PLATALEA LEUCORODIA Linnæus, Syst. Nat. ed. x, i, p. 139 (1758—Europa. Restricted typical locality: S. Sweden).
*Platalea leucorodia* Linnæus, Yarrell, iv, p. 237; Saunders, p. 393.
*Platalea leucorodia leucorodia* L., Pract. Handb., ii, p. 192.

**Habitat.**—Though mainly frequenting reedy meres and lagoons for breeding purposes is primarily a bird of open marshes and shallow waters which are at any rate not wholly reed-enclosed, and feeds largely on mud-flats and estuaries. *B.W.T.*

**Field-characters and General Habits.**—*White colouring and remarkable spatulate bill* at once distinguish Spoonbill. Size intermediate between Great White Heron and Little Egret, but on wing even if shape of bill is not made out is at once distinguished from either by *neck as well as legs being stretched out*. In side view on wing beak looks slender and slightly decurved at tip. Build and carriage on ground are heron-like, but neck shorter and less slender than in typical herons and egrets. At close quarters orange-tawny patch on throat of adult and (in summer) elongated, crest-like feathers on back of crown are visible. Buffish-yellow patch at base of neck more or less distinct in summer; legs black. Bill of adult black with yellow tip; that of young lacks corrugations of adult and is flesh-coloured at least till autumn, but later becomes dark. Young birds have black tips to primaries. Total length *c.* 34 ins.; body *c.* 15 ins.

Gait heron-like, often rests on one leg. Flies rather slowly with regular wing-beats, sometimes gliding. Will soar to considerable elevations like Stork. Seen mostly on ground, but perches quite freely on trees where present. Feeds in the open in marshes and shallow water, in which it wades with end of bill immersed and swept from side to side with mandibles slightly open, closing on anything eatable. Will occasionally swim short distance to cross creek or channel. Sociable in disposition, commonly in small parties and sometimes larger flocks, usually flying in single file. Does not, however, associate much with other species, generally breeding in colonies of own species alone. Though feeding to some extent by day, does so more regularly towards dusk, flighting like duck to favourite feeding places. *B.W.T.*

**Voice.**—A very silent bird, as a rule uttering no sound even when disturbed at breeding places, a low grunting sound being apparently the sole note of adults. Nestlings squeak or wheeze in a low key (B. Beetham). *B.W.T.*

**Display and Posturing.**—When excited makes clappering sound by rattling mandibles together, and when strongly so not only raises crest-feathers, but expands them fanwise. J. H. Gurney records observing a couple "dancing in the odd way peculiar to birds of the stork family." *F.C.R.J. & B.W.T.*

**Breeding.**—Nests in colonies of varying size, from a few pairs up to 200 or so; in Europe generally in dense reed-beds, but also at times on bare islets in lagoons and on tamarisk bushes in marshes, though the eastern race is normally a tree-nester. *Nest.*—Often built quite close together, only a few feet apart, about 1 ft. to 1½ ft. in height, of dead reed-stems, drifted vegetation from shore, and when in bushes, of sticks and dead branches of tamarisk. Reeds trampled down by old and young birds form open space near nests, which become almost solid with droppings of young, even large dead young being buried in the mass. *Eggs.*—Usually 4, sometimes 3 and occasionally 5: 6 recorded twice: dull white, rather scantily spotted with smears and blotches of rusty-brown: exceptionally boldly marked: slightly elongated ovoid in shape. Average of 100 eggs (25 by E. Rey, 7 by O. Reiser), 67·18×45·42. Max.: 74·6×44·9 and 64·5×49·2. Min.: 58·2×47 and 67·5×41 mm. Average weight, 6·9 grams. *Breeding-season.*—Usually latter part of

April in Spain, and from beginning of April to early May in Holland, but considerable variation between different colonies in same district. *Incubation.*—Eggs laid at intervals of several days and incubation begins before completion of clutch, probably with first egg: both sexes take part. Period estimated at 21 days (V. Holstein), but no definite observations. *Fledging.*—Young fed by regurgitating food from crop with vigorous gulps into upper-part of throat, picked out by young from widely-opened bill (B. Beetham): they leave nest at about 4 weeks, but cannot fly freely till about three weeks later. Probably single-brooded, but fresh eggs may be found in some nests up to early June. *F.C.R.J.*

**Food.**—The few British records include vegetable matter, chiefly fibre, with fruit of *Sparganium* and carpel of *Potamogeton*: also apparently marsh grasses and remains of small fish, probably roach. From Continental sources, small fish, mollusca (*Tellina*, water-snails, etc.), tadpoles and spawn, probably small frogs, worms, leeches, newts, insects (Odonata, Trichoptera and larvæ, Coleoptera (especially water-beetles and larvæ)) and Crustacea: also some vegetable matter. *F.C.R.J.*

**Distribution.**—*England.*—Regular visitor to Norfolk, sometimes singly but often in parties (17 largest), probably regular Suffolk, almost regular recent years Hants and frequent Devon and Kent. Only a vagrant elsewhere, chiefly in coastal counties. Has occurred all months of year, but most usual April to Nov.; more on E. coast April-July and S. coast Sept.-Nov. One Kent, Aug. 1912, was ringed as nestling Holland same year. Formerly bred in high trees Norfolk and Suffolk (about middle 17th century), Sussex (1570), and Fulham, Middlesex (1523). *Wales.*—Vagrant. Especially Dovey Estuary and Pembroke and recently Carmarthen. Formerly bred Pembroke (1602). *Scotland.*—Rare vagrant. Has occurred even in I. and O. Hebrides, Orkney and Shetland. *Ireland.*—Rare vagrant. About forty times in maritime counties, mostly in south and latter half of year. *H.F.W.*

**Distribution Abroad.**—Palæarctic and N.E. Ethiopian regions. Typical race breeds in Europe locally in S. Spain (rare), Holland (many), Denmark (only in 1928), Austria, Hungary, Yugo-Slavia, Albania, Romania, Bulgaria, S.E. Russia, and Transcaucasia. Replaced by allied races in lower Red Sea and Somaliland (*P. l. archeri*) and in Asia, in Syria, and from the Caspian to Kirghiz Steppes, Turkestan, Iraq, Afghanistan, Baluchistan and India (*P. l. major*). Typical race winters in tropical Africa, occurring in France, Belgium and Mediterranean region on passage: accidental in Færoes, Norway, Sweden, Finland, Baltic states, Germany, Switzerland, Czecho-Slovakia, Poland, N. Russia and Atlantic Is. (Azores, Madeira, Canaries). *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. SUMMER.—Whole plumage white except round base of neck where feathers are yellowish-buff or tipped yellowish-buff, patch of these feathers varying in extent and intensity of colour; at back of crown crest of long, narrow, pointed feathers with their webs decurved and rami detached with very short radii on basal part of feathers, white tinged yellowish-buff (length of crest-feathers 100–120 mm., slightly longer in ♂ than ♀). This plumage is acquired by complete moult Jan.-March. WINTER.—Another complete moult appears to take place in late summer or early autumn, but very few moulting autumn birds are available for examination. Plumage as summer but no long crest-feathers and feathers at base of neck white not yellowish.

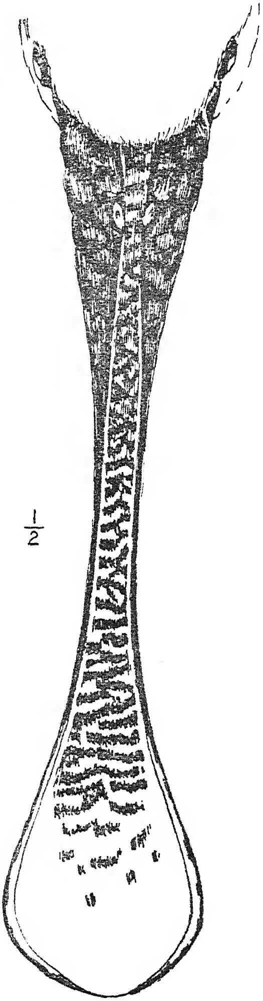
NESTLING.—At first covered rather sparsely with silky tipped down dull white. Later when feathers begin to sprout they push out this down and about same time a very short and more compact creamy-white down grows very thickly all over body, and this may be under-down of feathered stage. Chin, centre of throat and round eyes bare at all stages as in adult.

JUVENILE.—Like adult winter but *primaries* and *primary-coverts* with brownish-black shafts and tips, varying in amount but most marked on outer primaries, secondaries with black shafts; most body-feathers and wing-coverts with basal half of shafts black, but tips usually white.

FIRST SUMMER.—The juvenile plumage commences to moult Jan. but is often not finished by May, moult is complete and new plumage is like juvenile but with less black at tips of outer primaries and primary-coverts and secondaries and rest of plumage with no black on shafts.

SECOND SUMMER.—Insufficient material is available to trace sequences exactly but some birds with crests and otherwise as adults have distal part of shafts of primaries brown and tips of outer primaries with brown-black marks and these appear to be birds two years old.

MEASUREMENTS AND STRUCTURE.—♂ wing 375–395 mm., tail 110–120, tarsus 140–150, bill from feathers 205–230 (5 measured). ♀ wing 350–370, bill 175–190 (8 measured). Primaries (1st vestigial one not included): 2nd longest, 3rd as long or 5 mm. shorter, 1st 10–15 shorter, 4th 8–10 shorter, 5th 30–40 shorter, 6th 60–70 shorter; 2nd to 4th emarginated outer and 1st to 3rd inner webs. Tail square, 12 feathers, tips rounded. Under tail-coverts about three-fourths as long as tail-feathers. Bill very long, nearly straight, very thin and flat, nearly as broad as head at base, gradually narrowing towards middle and broadening to a flat, spoon-like shape at tip, extreme tip of upper mandible decurved; along each side of upper mandible a narrow groove and another down centre of lower mandible, angle of which is very long and narrow. Surface of upper mandible especially at base and sides and of under mandible corrugated in adult but much smoother in young. Nostrils narrow, elliptical, on each side of centre line of bill. Skin of loral region, round eyes, chin and down centre of throat narrowing to a V-shape, bare. Lower half of tibia bare. 2nd, 3rd and 4th toes connected at base with webs, claws short and stout.



The Spoonbill (*Platalea l. leucorodia*). Bill of adult from above.

SOFT PARTS.—Bill black, tip yellow, juv. bill flesh-pink; bare skin on fore-part of lores black, but rest and round eyes, chin and throat yellow; legs and feet black (juv. pale yellowish to slate, F.C.R.J.); iris red. *H.F.W.*

**Characters and allied forms.**—Shape of bill and bare skin extending down centre of throat distinguish species. *P. l. archeri* (Red Sea, Somaliland) is smaller; *P. l. major* (Egypt, Syria eastwards) is larger. *H.F.W.*

## **Genus PLEGADIS** Kaup

PLEGADIS Kaup, Skizz. Entw. Gesch. und Naturl. Syst. Eur. Thierw., p. 82 (1829—Monotype : *P. falcinellus*).

Feathers of head and neck in adult narrow. Bill long, sickle-shaped, nostrils like slits. Tibia half bare. Tarsus in front with large scutes, behind reticulated. Claw of middle toe pectinated. Eggs deep blue. Old World, America.

*PLATE 73.*

## 288. **THE GLOSSY IBIS—Plegadis falcinellus falcinellus** (L.)

TANTALUS FALCINELLUS Linnæus, Syst. Nat., ed. xii, i, p. 241 (1766—" Habitat in Austria, Italia ").
*Plegadis falcinellus* (Linnæus), Yarrell, iv, p. 231 ; Saunders, p. 391.
*Egatheus falcinellus falcinellus* (L.), Hand-List, p. 122 (1912).
*Plegadis falcinellus falcinellus* (L.), Pract. Handb., ii, p. 195.

**Habitat.**—Frequents chiefly reedy marshes, lagoons and inundated country, but also feeds on mud-flats and sea-shore, where most of those visiting Britain are observed. *B.W.T.*

**Field-characters and General Habits.**—*Curved bill gives appearance of Curlew* (though similarity does not extend to wings, which are broad and rounded), and combined with *dark colour*, which looks almost black at a little distance, both in air and on ground, make bird readily recognizable. Flies with neck and legs extended, the legs drooping a little. General colour in breeding-season rich deep purplish-brown, wings and tail darker, glossed green and purple. In winter duller, more brownish-black, head and neck streaked whitish ; young birds similar, but browner, with less white streaking. Total length *c.* 22 ins. ; body *c.* 12 ins.

Gait heron-like. Wing-action more rapid than in herons and egrets ; sometimes glides for considerable distances. Often flies high. Markedly sociable, nearly always in parties or flocks, and breeding in colonies with other species, such as Little Egret, Buff-backed and Night-Herons. Flies in compact groups, but also, especially when travelling some distance and habitually on migration, in long lines extended diagonally, or almost at right angles, to line of flight and sometimes undergoing remarkable serpentine undulations (Naumann). Perches freely on trees. Feeds much like Curlew, probing mud and ooze with its long bill, but often wades in water and can swim on occasions. Captive birds generally roosted on high perch and had characteristic attitude when sunning themselves, with one wing raised and fully extended and other hanging limply (Lilford). Flocks sometimes perform striking evolutions, the birds plunging downwards with partly closed wings at a great speed, shooting this way and that in their descent (Naumann). *B.W.T.*

**Voice.**—Generally a silent bird, but sometimes utters a harsh grating note rendered as " gra-a-k " (A. W. Boyd) and described by Lord Lilford as a " decidedly corvine, prolonged guttural croak " ; I have also heard subdued grunting sounds from a flock. Note at nest is described as a grunting sound, followed by four distinct notes something like bleating of a young calf or sheep ; also guttural cooing notes when caressing one another or young (O. E. Baynard). *B.W.T.*

**Display and Posturing.**—Nest-relief is accompanied by much billing and caressing, birds standing erect, preening one another's feathers and appearing to rub bills, with accompanying cooing notes. In pairs observed, this occurred only when female relieved male, as female flew from nest on hearing call of returning male (O. E. Baynard). *F.C.R.J. & B.W.T.*

**Breeding.**—Somewhat erratic in breeding, colonies varying much from year to year. Very sociable: nests close together and often in company with other species. *Nest.*—Sometimes nests on reed-beds, building with dead reed-stems: at other times small but substantial stick nest in sallows growing in water or among tamarisk bushes, lined with green leaves of reed, and in Oriental region in trees growing in water. Colonies at times very large, 2,000 or more pairs. Building by both sexes equally. *Eggs.*—Usually 3-4, 5 occasionally and 6 recorded: colour very deep uniform verditer blue, much darker than any heron's egg, ovoid in shape. Average size of 97 eggs (50 by E. Rey), 52·49×36·92. Max.: 57·8×38 and 57·5×40·3. Min.: 47×34 and 50×33·5 mm. *Breeding-season.*—Variable: sometimes from 2nd week May or not till June. *Incubation.*—Eggs laid on consecutive days (O. E. Baynard), usually incubation begins on completion of clutch: by both sexes, but larger share by hen. Period, 21 days (O. Heinroth). *Fledging.*—Young fed by both parents by regurgitation from crop in instalments: placing bill in that of parent at side and gradually running up to the throat (K. Morris). After two weeks did not stay in nest, but returned to be fed. When breeding among reeds, feeding becomes communal and individual recognition hardly possible. Apparently single-brooded. *F.C.R.J.*

**Food.**—The few British records include only insects and small Mollusca. On Continent in some districts main food consists of leeches (Hirudinea), but insects and larvæ taken include Orthoptera (grasshoppers and crickets), Odonata, Trichoptera (*Phryganeidæ*), Coleoptera (chiefly water-beetles, *Hydrophilus*, etc.) and Diptera (larvæ of *Eristalis tenax*, etc.): also small Mollusca (*Planorbis, Ampullaria, Limnæa, Mytilus pusillus*, and small land snails), Amphibia (small frogs, tadpoles and spawn), probably occasionally small fish: minute Crustacea (shrimps), earth-worms and some vegetable matter. In winter-quarters freshwater Crustacea (small crabs) recorded. *F.C.R.J.*

**Distribution.**—*British Isles.*—Irregular autumn-visitor (Aug.-Nov.), occasionally winter and April-June. Often in small parties. Most frequent on S., S.W., or E. (as far north as Yorks) coasts of England. Very rare inland and in Wales and N.W. England and north of Yorks on E. side. In *Scotland* some thirty recorded besides flock of about twenty Orkneys, Sept., 1907. In *Ireland* over sixty recorded mostly in autumn and mostly from southern maritime counties. *H.F.W.*

**Distribution Abroad.**—S. Palæarctic, Ethiopian, Oriental, Australasian, and S. Nearctic regions. Typical race breeds very locally in Marocco, S. Spain (?), N.W. Italy, S. France (?), Austria, Hungary, Yugo-Slavia, Albania, Romania, Bulgaria, S.E. Russia (Volga delta), Caucasia, Asia Minor, Syria (Lake of Antioch), Iraq (?), Persia, Transcaspia, Kirghiz Steppes to Turkestan, Afghanistan and India. Also in tropical Africa, Madagascar and S.E. United States, probably Mexico, Haiti and Cuba. Replaced by an allied race from Java to Australia, Philippines and Celebes. Typical race winters in tropical and S. Africa, also tropical Asia in Old World, and occurs casually in Iceland, Færoes, Norway, Sweden, Denmark, Finland, N. Russia and Madeira. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—(*Upper-parts* and *neck*) whole head, neck and throat brown-black, each feather narrowly edged white, giving streaked appearance, especially on chin and cheeks where there is more white (feathers of head and neck rather narrow with rounded tips) ; mantle, scapulars, back, *tail*, *wing-coverts* and *inner secondaries* very dark glossy purple and green ; *primaries*, *primary-coverts*, axillaries and under wing-coverts glossed purer green ; *outer secondaries* more bronze-green ; *lesser wing-coverts* dark brown-red, feathers more or less tipped glossy green and purple and some wholly so ; *under-parts* brown-black sometimes with slight purplish gloss and usually with some brown-red ; under tail-coverts blacker and more glossed blue and purple ; tibia sometimes inclined to be rufous. This plumage is acquired by complete moult June to Nov. *Summer.*—A moult, in some cases certainly complete and probably usually so, takes place Jan. to May. New plumage—(*upper-parts* and *neck*) crown glossed red-purple, more greenish on fore-part ; chin and cheeks blackish, slightly glossed purple ; neck, upper-mantle, shorter scapulars, and basal portions of some longer ones, lesser wing-coverts, *throat* and *under-parts* rich, deep brown-red ; (feathers of head, neck and throat longer, narrower and more pointed than in winter and without white edgings) ; rest of *upper-parts* and *wing-coverts*, *wings*, *tail* and axillaries, under wing-coverts and under tail-coverts as winter but purple and green gloss more brilliant.

NESTLING.—Down dull black, usually with white patch on back of crown and some white bands on throat. Down of very loose structure, not very long and covering bird very sparsely. Bill pink with three black bands—at base, in middle and at tip—loral region bare as in adult.

JUVENILE.—Much like adult winter but *head* and *neck* browner and with white streaking less distinct and sometimes confined to head, *throat* occasionally with some white bands as usually in nestling ; *upper-parts* and *wing-coverts* considerably duller than in adult and much more green and bronze-green with little purple ; *under-parts* browner, not so blackish, and with little or no gloss and no brown-red ; under tail-coverts blacker, with a little green gloss ; all *wing-coverts* glossed green.

FIRST WINTER.—The juvenile body-plumage, but apparently not wings and tail, is moulted Aug.-Sept., and bird then becomes much more like adult winter, except that there is no brown-red on *under-parts* and *wing-coverts* are as in juvenile.

FIRST SUMMER.—A complete moult takes place in spring as in adult, after which bird appears to resemble adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 270–295 mm., tail 95–105, tarsus 85–110, bill from feathers 115–142 (12 measured). ♀ wing 250–275, bill 100–135. Primaries (1st vestigial one not included) : 2nd longest, 3rd usually as long, sometimes 5 mm. shorter, 1st occasionally as long, usually 3–10 shorter, 4th 10–20 shorter, 5th 25–35 shorter, 6th 45–55 shorter, 7th 60–85 shorter ; 2nd to 4th emarginated on outer and 1st and 2nd on inner webs. Tail square, 12 feathers, tips slightly rounded. Bill slender, decurved, much compressed, tip rather flattened and rounded, upper mandible ridged and lower grooved. Nostrils very small and slit-like. Skin of loral region and just above and below eye bare as well as that between lower mandible. No rictal or nasal bristles. About half tibia bare. Toes long and slender, " soles " fleshy and spreading, 3rd and 4th webbed at base. Claws long, blunt and fairly straight, that of middle toe somewhat flattened with two or three pectinations on its inner edge.

SOFT PARTS.—Bill dark grey-brown ; legs and feet paler greenish-brown ; iris dark brown ; loral skin purplish-black. *H.F.W.*

**Characters and allied forms.**—Long, curved bill, bare lores and tibia, and rich dark coloration are distinctive. *P. f. peregrinus* (Java, Australia) is slightly smaller. *H.F.W.*

## Sub-order ARDEÆ.

Herons and allies. Nidicolous, mainly fish-eating Ciconiiformes with 19–20 cervical vertebræ, interorbital septum widely fenestrated, vomer larger than in Ciconiæ, sternum with large spina externa, hind toe attached on level with inner one, syrinx tracheo-bronchial with intrinsic muscles, an aftershaft, powder-down patches on sides of rump and on breast, complex hypotarsus (*i.e.* proximal end of " tarsus " with two bony bridges, through which flexor tendons run), long featherless tracts (apteria) at sides of neck, down confined to apteria, feather tracts very narrow, and long pointed tongue except in *Cochlearius*. Eggs unmarked, generally blue, also olive, white and exceptionally yellow.

## Family ARDEIDÆ.

With the characters of the sub-order, to which the following points may be added. No occipital fontanelles. Neck about middle with " kink " caused by unequal length of vertebræ, especially great length of sixth; neck S-shaped in flight and frequently also when settled. Sternum with one incision on either side. Furculum connected by ligament with sternal keel. Tarsus in front with large scutes, very rarely reticulated, short web between outer and middle toes, middle claw more or less obviously pectinated. Holorhinal, nares pervious, narrow and longitudinal. A single small cæcum. No ambiens muscle. Muscle formula AXY (exceptionally XY). Pectoral muscle not divided into two layers. Ten functional primaries, the first being vestigial (lost in *Cochlearius*). Usually 12 rectrices, rarely 8 or 10. Oil-gland with very short feathers (longer in *Nycticorax*), unfeathered in a few genera. Bill straight (sometimes slightly curved), with more or less distinct " tooth " before tip, tip of upper mandible frequently serrated. Lores bare. Body small, appearing much larger owing to great amount of soft feathers. Nestlings with only one coat of down. About a hundred species in all countries.

## Genus ARDEA L.

Ardea Linnæus, Syst. Nat., ed. x, i, p. 141 (1758—Type by subsequent designation, Gray, 1840, *A. cinerea*).

Large herons of different colours, but never entirely white. Bill strong, straightly pointed. Occiput with a few long narrow feathers or a crest without latter. Scapulars elongated, but not forming a long train of filamentous ornamental plumes, not reaching tip of wing. 11 species in all parts of world.

*PLATE 73.*

### 289. THE COMMON HERON—Ardea cinerea cinerea L.

Ardea cinerea Linnæus, Syst. Nat., ed. x, i, p. 143 (1758—Europe. Restricted typical locality: Sweden).
*Ardea cinerea* Linnæus, Yarrell, iv, p. 162; Saunders, p. 367.
*Ardea cinerea cinerea* L., Pract. Handb., ii, p. 198.

**Habitat.**—Frequents almost any kind of country with waters affording it suitable food-supply and (at least near margin) not too deep and shelving to wade in. Though naturally most common in well-watered lowlands it ranges from coastal waters to mountain tarns and may be met with equally on large or small rivers and lakes, meres, reservoirs and ponds, marsh-dikes, ditches and pools, flood-waters, sea-shore, tidal estuaries and salt or brackish lagoons.

At times foraging excursions may be extended into fields far from water, and abroad has even been observed in desert regions, probing for lizards and beetles (R. Meinertzhagen). Most actual breeding-sites are low down: substantial heronries are not recorded in Brit. Is. much above 500 ft. and most are much lower, though small groups and odd nests occur locally to 7–800 ft. and exceptionally to 1,000 ft. Heronries are generally in or near feeding grounds, but good evidence was obtained in 1928 census of regular foraging ranges up to 12 miles from nesting place (much longer ranges are recorded, but require confirmation). Exceptionally regular breeding-sites may be as much as 5 miles from nearest possible feeding place. *B.W.T.*

**Field-characters and General Habits.**—Heron is only bird of the stork kind occurring regularly and commonly in Brit. Is. and is amongst the largest common British birds except Swan. *Its size, long bill and legs, and sober colouring of grey, white and black* are distinctive whether the bird has long slender neck more or less extended or is resting with head sunk between shoulders or flying with head drawn back, legs extended behind, and slow regular beats of broad, rounded wings. Upper-parts and tail ash-grey; head and neck white with black band running back from behind eye to terminate in long pendant crest, and blue-black streaks on front of neck; feathers at base of neck elongated; under-parts greyish-white, some black at sides; wing-quills blackish. Bill yellow, legs brownish. Immature birds are more uniform-looking than adults, with greyer neck, no black on head and only short dark grey crest. Total length *c.* 36 ins.; body *c.* 16 ins.

Flight, see above. Sometimes glides for some distance before pitching; soaring flights are not uncommon, but not as regular or characteristic as in case of Stork; for aerial evolutions see under "Display." Gait a deliberate walk. Spends much time on ground, but perches freely on trees, etc., and is frequently seen standing erect and motionless, often on one leg, with head sunk as described, by water's edge or on sandbank or low rocks close by. When on the alert neck is stretched upwards with only a slight curve, but when fishing it walks slowly and noiselessly along in shallow water with body considerably less upright than when at rest and neck curved in an S, ready to be shot out to seize prey. At other times it stands motionless in shallows waiting for a fish to pass within reach. Fish are swallowed head first; large ones are frequently stabbed with bill, these and eels being hurriedly taken to bank and then often stabbed or beaten on ground or anything handy in order to disable them before swallowing. Big fish may be taken ashore and flesh picked from bones, and other prey caught on ground. Apparently systematic "beating" of a field for mice by a number of birds in line has been recorded in autumn (J. Ritchie), but such behaviour appears to be exceptional. Habits rather crepuscular, especially active in evening and near dawn. Does not normally swim, but has occasionally been observed to do so (C. Waterton, H. G. Alexander, A. W. Boyd and others). Even outside breeding-season is rather gregarious and often seen in company, though single birds are also frequent. In Brit. Is. does not associate with other species at breeding places, though abroad nests may be found mixed with those of Purple Heron, etc. Roosts in trees, or on cliffs, low rocks or islets on treeless coasts. Pellets commonly consist mainly of fur of water-voles mixed with portions of skeleton and often with chitinous remains of insects. They are irregular in shape and size. Use of powder-down in preening has been described by J. M. Dewar (*Brit. B.*, ii, pp. 285–9). Bill is rubbed gently up and down in powder-down patches, appearing bluish when withdrawn (especially lower mandible) owing to coating of powder. Bill is then used in preening and drawn over or amongst feathers, powder being rubbed off and replenished at intervals. Author found rami easier to mat with aid of powder than without and it also helps to waterproof feathers. Use in removal of fish-slime from head, as described for Bittern (*q.v.*), has not been recorded, but seems likely to occur, as Heron is also great eel-eater. *B.W.T.*

**Voice.**—Ordinary note a loud, harsh " frarnk." Vocabulary has been carefully studied by J. Verwey, who distinguishes following other notes : (1) Pairing or advertisement call, resembling ordinary call, but with more of an " o " sound, uttered by male from old nest or branch in early spring ; may be used for several days till mate secured. (2) Greeting note " arre-arre-ar-ar-ar-ar " used by either sex returning to nest ; persists as an alighting call after young have flown. (3) Note associated with stretching posture (see under " Display ") ; a rather soft short " hoo " uttered at maximum upward extension of head and neck, followed by gurgling " oooo " as head and neck are brought backwards.[1] (4) Pursuit-note, a loud, very harsh " schaah," used in chasing another bird, usually of same sex, from vicinity of nest ; apparently also sometimes by the pursued bird. (5) Anxiety-note, a soft, murmuring " gō-gō-gō," sometimes more " ar " or " or " or " ooooo," nasally uttered ; apparently specially associated with disturbing objects *below* the bird (*viz.* man under nest) ; not confined to breeding-season. (6) Threatening note, a loud " gooo " accompanying stab with open beak if another bird pitches too near. (7) Special note of female associated exclusively with unsuccessful attempt at coition by male. This summary, while no doubt covering the main types of notes, hardly conveys the great variety of weird and raucous noises heard in a heronry. Greeting notes, for example, vary quite considerably, and a specially prolonged deep form of the note generally coming at climax of excitement seems to deserve special stress (*cf.* Gramophone record : E. M. Nicholson & L. Koch, *More Songs of Wild Birds*) ; growling and retching sounds are often noticeable. E. Selous's account of notes in connexion with pairing (see under " Display ") is difficult to reconcile fully with Verwey's ; a note described as a musical " kōōp," apparently chiefly an encouraging or invitatory note to freshly arrived female, but used by both sexes and often associated with bill-clicking, appears to be distinct from (1), (2), and (3). Nestlings have loud chattering or ticking note. When squabbling they have note much like (4) of adults and in stabbing at one another one much like (6). (2) is developed as soon as fledged and ordinary call apparently only some time after (Verwey). *B.W.T.*

**Display and Posturing.**—Pairing biology has been extensively studied by J. Verwey (*Zoologische Jahrbücher, Abt. f. allg. Zool. u. Physiol.*, Bd. xlviii, 1930, pp. 1–120 ; abbreviated account in *Verh. d. VI Int. Ornithol.-Kong., Kopenhagen, 1926*, pp. 390–413). Chief ceremonies are : (1) Greeting. Bird arriving at nest erects crown-feathers and utters note (2) (see under " Voice ") ; bird on nest stands up and responds with stretching posture, in which head and neck are extended in straight line upwards, then brought backwards and downwards, bill still pointing vertically, while bird flexes its legs and lowers body; then stands up again. Accompanied by note (3). (Wing-waving recorded as part of greeting: E. Selous.) (2) Snapping ceremony. Head brought forward and downward, with neck extended, to level of feet or lower (*e.g.* over edge of nest), with legs somewhat flexed, while mandibles are snapped together with quite loud sound. Typical course of pairing is described by Verwey as follows. Male in early spring calls for mate at old nest or branch chosen as nest-site, using note (1) and the stretching ceremony, with now and then the bill-snapping; also pulls at twigs on tree or in nest and may fetch twigs from ground. On arrival of female note ceases, stretching ceremony is performed a few times and, as soon as female prepares to pitch, the snapping ceremony, which may be repeated 20–40 times. Author believes this ceremony to be peculiar to male during this phase of breeding-cycle, but according to Selous (see below) it continues into incubation period and seems to be employed by both sexes. Approach of female is generally gradual and cautious; if too abrupt ordinary instinct of male to drive off any Heron entering nest "territory" is liable to overmaster pairing instinct. As they become accustomed to mutual proximity tentative caresses of one another's plumage take place, initiated by male, and sooner or later he offers stick to female, which she accepts (sometimes with stretching posture before taking it) and builds into nest. Spectacle of female building greatly excites male, which persistently caresses female, mutual stimulation presently leading to coition. Essentials of this sequence of events were observed by E. Selous as early as 1916 (*cf. Realities of Bird-Life*, pp. 33–52), though he identified sexes wrongly. Coition is not immediately preceded by any posturing; it usually takes place after feather-pecking or following nest-relief by either sex, female standing on nest or branch, with neck extended approximately horizontally, supporting male, which often holds on to her neck-feathers with bill and raises or waves wings; female may also flap wings to maintain balance. Selous observed bill-snapping following coition. In "introductory" period before first coition birds are often still somewhat suspicious of one another, and a chance abrupt movement may lead to defensive response and so to squabbles and "bill-sparrings"; often after a moment of tension bills are merely used in a caressing movement, which, however, is not otherwise used and only follows defensive reaction. A clattering noise with bill distinct from the ordinary snapping or clicking was once heard by Verwey from two different birds, but appears to be unusual. Attempts at "rape" of breeding females, by both unpaired and paired males, are apt to occur. J. S. Huxley shows that greeting ceremony at nest-relief is not invariable and also describes a posture (seen once, Mar. 22) combining features of stretching and snapping ceremonies, but possibly abnormal; bird facing mate shot up head and neck vertically "uttering deep groans," then suddenly leaned forward and lay flat on nest, stretching neck horizontally towards mate with clicking note, repeating whole performance several times. In spring birds soar over the heronry and sometimes chase one another or perform evolutions in the air, tilting over to one side or indulging in headlong or zigzagging dives. Such performances, however, have been observed also in autumn (R. Brown), and "looping the loop" has once been recorded in case of a single bird (W. B. Nichols), so that such displays are evidently not in any rigid sense sexual. Communal gatherings have been stated to occur in winter at which birds perform a kind of dance, but confirmation of this is needed. M. D. Haviland observed one of a group in December " execute a few half-hearted steps." *F.C.R.J. & B.W.T.*

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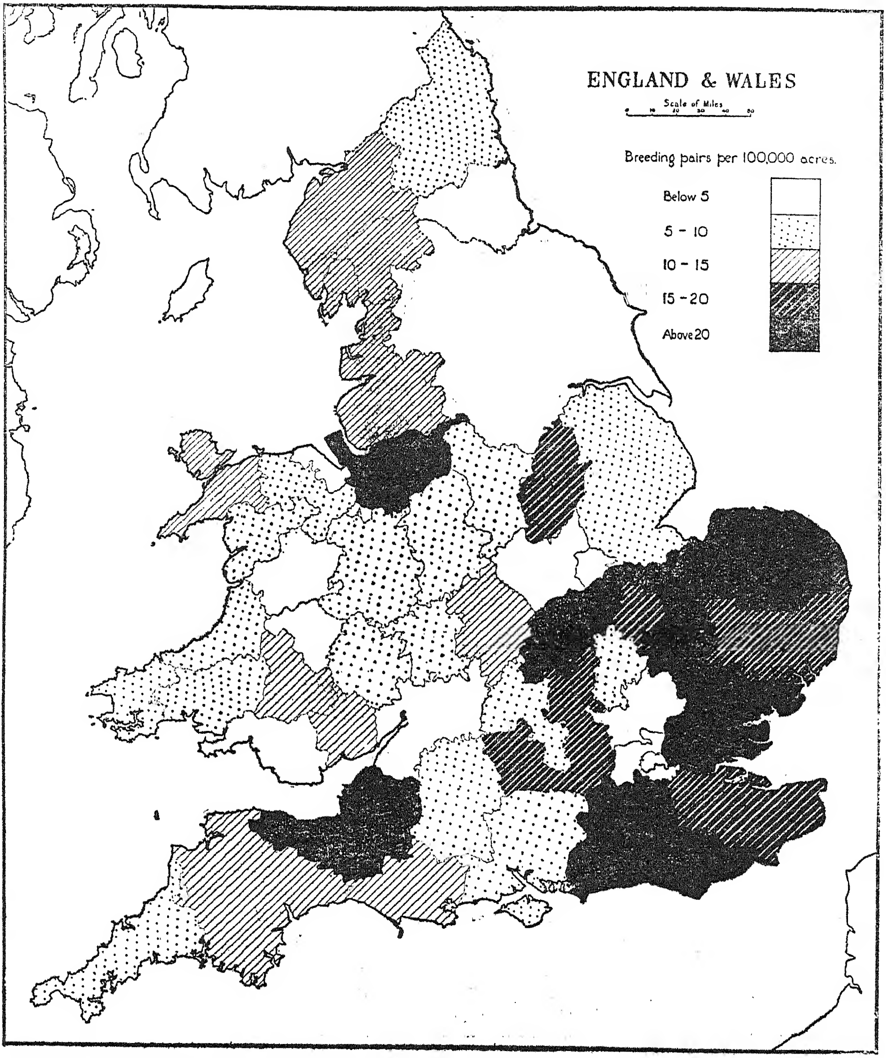
[1] For some reason this sound is not included in Verwey's account of the notes, but it is referred to in connexion with the ceremonies and described as very striking.

**Breeding.**—In Brit. Is. nests generally in colonies of varying size, normally in high trees, but occasionally in small trees, bramble-clumps, or on ground among heather, on islands, ledges on face of cliffs, among reeds by lake side, and once recorded on ground in wood and on shingle on beach. Several nests may be built in same tree. *Nest.*—When first built is small, but as it is used year after year till blown down, may become very large: of branches and sticks, lined with smaller twigs, and sometimes roots, dead grass, etc., when in trees: in reed-beds, however, built entirely of dead reed-stems. Male usually provides material while hen remains on nest and builds. *Eggs.*—Generally 3 to 5, but 6 occasionally met with and 7 twice recorded: 2 minimum. Colour greenish-blue, sometimes stained with blood or whitewash, but not marked: no gloss. Average of 100 British eggs, 59·94×43·24. Max.: 66·7×45 and 61·5×49·7. Min.: 53·5×43·2 and 59·6×40 mm. Average weight, 4·73 grams (3·5 to 5·6 gr., E. Rey). *Breeding-season.*—Begins in February, but many birds do not lay till March. *Incubation.*—Eggs laid at 2 days interval, sometimes a pause of 3–4 days: frequently begins with 1st egg, but also cases of 2nd egg, penultimate and on completion of clutch recorded: by both sexes. Period apparently 25 days, but 23, 26 and even 27, 28 recorded. *Fledging.*—Young fed by both sexes: bill seized by young from sides, and regurgitated food taken from bill by young. Later food may be disgorged on to nest. Period: young fly at 50–55 days. Many pairs single-brooded, but definite proof of second brood in some cases. *F.C.R.J.*

**Food.**—Very varied: mainly fish (61% in 5 stomachs examined, W. E. Collinge), but water-voles and frogs also frequently recorded. Mammals (9·5%) include many water-voles, field-voles, brown rats, field-mice, moles, young rabbit, common and water shrews and bat (once each). Birds: Blackbird, Water-Rail, young Coot, Moorhens, Redshank and wild duck swallowed whole, young Pheasant and domestic ducklings also reported taken: also young terns, Dunlin and Snipe attacked, and once Swallow: many frogs, also spawn, toads, newts, slow-worm, and grass-snake 2 ft. long. Fish of many species, including perch, miller's-thumb (*Cottus*), flounder (*Pleuronectes*), stickleback (*Gasterosteus*), pike (*Esox*), carp (*Cyprinus*), roach, dace, chub, minnow (*Leuciscus*), samlet, sea- and brown-trout (*Salmo*), grayling (*Thymallus*), eel (*Anguilla*), lamperns (*Petromyzon*), etc. Mollusca (*Anodonta*, *Unio*, water-snails, etc.). Crustacea (crabs, crayfish, prawns and shrimps, *Asellus* (?)). Insects: Orthoptera (grasshoppers), Dermaptera (*Forficula*), Hemiptera (*Notonecta*, *Corixa*), Trichoptera (larvæ of *Phryganeidæ*: *Limnophilidæ* (*Sericostoma*)): Coleoptera (*Carabidæ*, *Harpalus*, *Pterostichus*, *Dytiscus*, *Agabus*, *Colymbetes*, *Coccinella*, *Hydrophilus*, *Aphodius*, *Geotrupes*, *Melolontha*, *Sitona*, etc.), Hymenoptera (*Allantus*, *Ichneumon*, *Formica*, *Vespa* larvæ), Diptera (*Chironomus*, *Ceratopogon*, *Bibionidæ*, *Empis*, etc.): Annelida (*Lumbricus*) and some vegetable matter. Above records are from British sources: for foreign data see E. Moltoni, *Rivista Ital. di Ornitol.*, 1936 (xiv), pp. 240–244. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident and passage-migrant and winter-visitor. *England and Wales.*—Breeding population during 1928–38 remained remarkably steady at about 4,000 pairs every year (see *Brit. B.*, xxxii, pp. 138–144). Breeding densities of 20 or more pairs per 100,000 acres are attained in the coastal counties between Thames and Wash, and also in Northants, Sussex, Somerset and Cheshire. Densities are markedly lower in Wales and N. England, except in Menai Strait and Morecambe Bay areas.



Map showing Density in England and Wales of the Breeding Population of the Common Heron. (Compiled by E. M. Nicholson and drawn by Mary Nicholson.)

The density is expressed in pairs per 100,000 acres by counties on the basis of the 1928 *British Birds* Census of Heronries, revised in the light of the latest available information, which in the case of twenty-three of the counties refers to 1938, and in nine other cases to years between 1928 and 1938. The highest density is for Sussex (36·5 pairs per 100,000 acres).

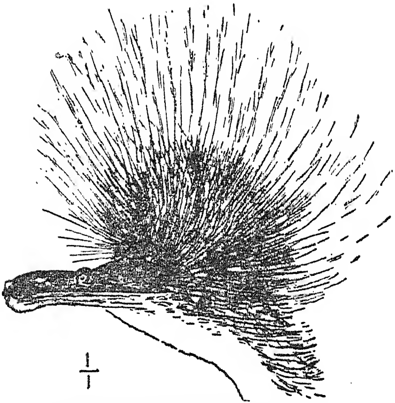
Breeds in some 300 scattered localities in all counties except Rutland and Middlesex, and apart from a small number of solitary nests colonies range from two to rather more than 100 pairs, largest at present time being in Sussex, Northants, Norfolk and Kent. There is evidence that many of these sites have been used as heronries for generations, and some for hundreds of years. In Hants, Gloucester, Staffs, Derby, N. Wales and elsewhere breeding stock is severely limited by human interference, but infiltration from other areas is continuous. *Scotland.*—Generally distributed but does not breed Shetland; in O. Hebrides first known to breed Lewis 1902, has increased considerably and now breeds also Harris, N. and S. Uist and Benbecula. Heronries considerably smaller on average in Scotland than in England. *Ireland.*—Generally distributed throughout, even breeding on islands off coast. Many occupied sites, but no very large colonies known. *E. M. Nicholson.*

**Migrations.**—*British Isles.*—Recoveries of ringed birds show that British Herons are resident and to a large extent sedentary, though there is a pronounced tendency, especially amongst juveniles, to disperse and wander, sometimes to such distances as to simulate real migration. Passage-migrants of Continental origin (ringed birds from S.W. and S. Norway, S.W. and S.E. Sweden, E. Denmark, Schleswig, Hanover, W. Flanders and N. France) arrive E. coast, Shetlands to Strait of Dover, mid-July to early Nov., chiefly Sept. Part disperse inland and remain as winter-visitors, others pass S. through western isles as winter-visitors to Ireland or down W. coasts England and Wales to winter-quarters there, some continuing from S.W. England to Continental winter-quarters. Return passage by same routes, March to June, but much less marked. *N.F.T.*

**Distribution Abroad.**—Palæarctic and Ethiopian regions. Typical race breeds in Europe north to 70° in Norway, 65¾° in Sweden, Finland (rare), N. Russia (? to 60°) and east to Urals. In south to S. Spain (Andalucia), central France, central Italy, Balkan peninsula, S. Russia and Caucasia. Also Canaries, N. Marocco, Algeria, Tunisia, Mallorca, Corsica, Sardinia, Crete, Egypt and W. Siberia to W. China (J. F. Peters), in south to Iraq, Persia, India and Burma. Replaced by allied races in E. Siberia, Mongolia, E. China, Hainan, Japan and Formosa: and in Madagascar and Aldabra Is. Largely resident, but northern breeders migrate to S. Africa: occurs S. France, Portugal, Madeira, etc., and in E. Mediterranean. Accidental in Greenland, Iceland, Færoes, Spitsbergen. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head and centre of crown white, sides and back of crown glossy-black (feathers, forming a crest, down middle of crown, long, lanceolate, with long, loose rami, two black feathers at back of crown very long (varying 80–210 mm. when fully grown, in ♀ usually shorter than in ♂), narrow and of closer structure than rest); back and sides of neck pale buffish-grey, often with mauvish tinge; upper-parts blue-grey, feathers of lower-mantle and especially upper scapulars with much elongated ashy tips (basal portion of these feathers normal, but distal portions with very long rami separated or united in groups of two or three, and those on distal part of shaft lying parallel and closely united to it, forming much elongated, pointed, lanceolate tip, lower scapulars normal, obtusely pointed feathers); (*under-parts*) cheeks and chin white; feathers forming more or less spotted line down middle of throat with distal halves of inner webs black and outer webs white; feathers of lower-throat and upper-breast pale buffish-grey, with some short, broad, black streaks and tips white (these feathers in structure as upper scapulars but with still more elongated, lanceolate tips); sides of breast and belly glossy-black, centre white, with some feathers with one web black and other white ; under tail-coverts white ; flanks, axillaries and under wing-coverts blue-grey, along side of wing from carpal joint to base of primaries white ; tibia white, tinged buff ; *tail-feathers* blue-grey ; *wing-feathers, bastard-wing* and *primary-coverts* glossy blue-black with blue-grey " bloom " on outer webs (under-side of wings dark blue-grey) ; *innermost secondaries* blue-grey ; *wing-coverts* blue-grey, paler and more ashy on outer feathers, upper-most line of *lesser coverts* slightly speckled white and blackish. This plumage is acquired by complete moult July to Nov. I have not found European adults moulting remiges and rectrices after Nov., but many show considerable moult of body-feathers Dec. and Jan., and especially crest-feathers Feb. to April. This seems to indicate a second partial spring moult, but from specimens examined there is no definite proof, though longest crest-feathers are usually absent in winter or have just started to grow and often not yet fully grown April.

NESTLING.—Down of whole crown dark brownish-grey at base with very long white bristle-like tips without rami, giving very conspicuous crested appearance, down of rest of upper-parts normal but long, dark greyish-brown in middle and pale grey on sides, of under-parts dull white. Lores, round eyes, chin and throat and back of neck bare, and down rather sparse on sides of back and centre of belly, otherwise covering bird very well. This down is all replaced by feathers of juvenile, and at the same time down grows in " powder " down patches.



Common Heron (*Ardea c. cinerea*). Head of nestling in down.

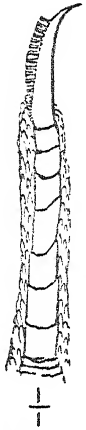
JUVENILE.—(*Upper-parts*) fore-head and sides of crown dark grey, back of crown dull black (feathers of crest elongated and narrow but not nearly so long or pointed as in adults and without the two very long feathers) ; sides and back of neck brownish-grey ; upper-parts brownish-grey (feathers of normal structure, not as in adult) ; (*under-parts*) chin white and feathers down middle of throat part white and part black as in adult, but black tinged brown ; feathers of lower-throat and upper-breast and down centre of breast white with broad brown-black stripe on inner webs (glossy-black sides of adult wanting, and feathers of lower-throat slightly long and of loose structure, but not with greatly elongated narrow tips as in adult) ; flanks, and under wing-coverts and *tail-feathers* brownish-grey ; under tail-coverts not so pure white as in adult ; *wing-feathers* like adult but with less " bloom " ; some blackish spots on white at carpal joint and a buff tinge on uppermost *lesser coverts*, otherwise *wing-coverts* brownish-grey, brownish tinge being especially marked on tips of feathers, and *greater* and *median coverts* often with whitish tips.

FIRST WINTER AND SUMMER.—Much like juvenile but (*upper-parts*) fore-head and sides of crown, neck, upper-parts and flanks more blue-grey, not so brownish ; crest-feathers longer and more pointed than in juvenile ; (*under-parts*) chin and cheeks purer white ; black down middle of throat, not brownish ; belly whiter, sides of breast and belly as juvenile not black as in adult (feathers of mantle and upper scapulars not elongated at tip as in adult, but with rami separated and slightly elongated). The juvenile body-plumage is moulted Sept.-Dec. (sometimes not until Feb.), but not wings, tail or wing-coverts.

SECOND WINTER AND SUMMER.—Much like adult, but fore-head grey with some very pale grey or whitish feathers, fewer feathers of scapulars and mantle with elongated ashy tips than in adult. This plumage is acquired by complete moult which appears to commence sometimes in May (earlier than in adult), but usually not until June or July. At next moult (*i.e.* when bird is 2 years old) it appears to become as adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 430–470 mm., tail 155–175, tarsus 135–165, bill from feathers 100–125 (12 measured). ♀ wing 425–460, bill 100–125. Primaries (1st vestigial one not included): 2nd, 3rd and 4th longest, but 2nd often 5 mm. shorter, 1st 5–20 shorter, 5th 10–25 shorter, 6th 40–55 shorter, 7th 65–85 shorter; 2nd to 4th (5th slightly) emarginated outer webs, and 1st and 2nd (3rd slightly) inner webs. Tail square, 12 feathers, tips rounded, under tail-coverts nearly as long as tail-feathers. Bill strong, straight, compressed, pointed, upper mandible ridged, towards tip cutting edges slightly serrated and at tip a small notch. Nostrils long and slit-like. Skin of loral region and just above and below eye bare. Basal half of back of neck bare of feathers, but hidden by feathers of sides of neck. No rictal or nasal bristles. About one-third of tibia bare. Toes long and slender, "soles" fleshy and spreading, 3rd and 4th webbed at base. Claws fairly strong, sharp and curved, that of middle toe flattened and pectinated on its inner side. Middle toe with claw 94–110 mm. On middle breast and belly large patch and each side of lower-back near insertion of legs small patch of "powder" down, white shortish down, with very fine and closely set barbs, much matted together and lying close to skin, very friable and greasy to the touch.

SOFT PARTS.—Bill, upper mandible yellowish-brown to yellow (blackish-horn in juv.), lower yellow to yellowish-brown; lores yellowish, round eyes greenish; legs and feet dull brown (nestling greenish); iris yellow. *H.F.W.*



The Common Heron (*Ardea cinerea*). Middle toe and claw of adult to show pectinations.

**Characters and allied forms.**—Large size and grey colour distinguish Common from other British herons. *A. c. jouyi* (E. Siberia, Japan, E. China) adult is usually white on neck and paler (often whitish) on wing-coverts, *A. c. firasa* (Madagascar, etc.) is larger. *H.F.W.*

*PLATE 73.*

## 290. THE PURPLE HERON—Ardea purpurea purpurea L.

ARDEA PURPUREA Linnæus, Syst. Nat., ed. xii, i, p. 236 (1766—"Habitat in Oriente." Restricted typical locality (Stresemann, 1920) France).
*Ardea purpurea* Linnæus, Yarrell, iv, p. 172; Saunders, p. 369.
*Ardea purpurea purpurea* L., Pract. Handb., ii, p. 202.

**Habitat.**—Marshes, meres, lagoons, and inundated country where more or less extensive reed-beds, willow-thickets or other swamp vegetation afford good cover, to which it resorts at all seasons and even on passage. *B.W.T.*

**Field-characters and General Habits.**—In general appearance resembles Common Heron, but slighter and smaller and at a little distance *decidedly darker*, while at closer quarters *dark slaty-grey back and wings and strongly striped, rufous neck* place identity beyond doubt. Crown entirely black, breast chestnut with some black at sides, belly and under tail-coverts black; long dorsal feathers streaked rufous, elongated feathers at base of neck streaked whitish, rufous and black. Head and neck look slenderer and more "snaky" than Common Heron. Latter on wing at some distance may appear darker in some lights than it is, but quills are strongly contrasted with rest of wing, compared to nearly uniform wing of present species, and to observers familiar with both the outlines are different; Common Heron is robust-looking bird, while Purple looks slighter and more " narrow-chested " with more marked concavity where base of neck joins breast. Toes are also much longer than in common species and according to H. Hildebrandt (quoted by G. Niethammer) difference is obvious in flight even at long range. Young birds are paler, with buff edgings to feathers of upper-parts, buffish under-parts, mainly chestnut crown and without the prominent black stripes on head and neck. Total length *c.* 31 ins.; body *c.* 15 ins.

Flight, gait and carriage as Common Heron (*q.v.*), but a more secretive bird fond of skulking in reed-beds. May quite frequently be seen in the open, but generally on sheltered pools or ditches close to reeds and rarely in such open places as Common Heron often visits. Is also more terrestrial, perching readily enough on bushes, especially at breeding places, but seldom in trees in Europe, though exceptionally it will nest in small to fair-sized trees and eastern race does so not uncommonly. Statement that when it does settle in trees it always takes cover amongst branches is not, however, invariably true, for I have seen one pitch on the top branches of a tree over 30 ft. from ground. Great length of toes enables it to walk over floating vegetation, and B. Beetham describes how breeding birds will simply walk over thick bushes without any attempt at grasping branches. According to Naumann has characteristic and peculiar resting and sleeping attitude with body nearly upright, but whole length of tarsus resting on ground. For " protective " attitude see under " Display and Posturing." At least as much inclined to crepuscular habits as Common Heron, if not more so, often remaining active long after dusk. Reputed to be less sociable than Common Heron, but in favoured haunts it is quite usual to see several together and it often breeds in colonies, sometimes mixed up with Common Herons. *B.W.T.*

**Voice.**—A more silent bird than Common Heron. Ordinary note resembles " frarnk " of that species, but not so loud and deep, while the harsh notes heard in a breeding colony are not unlike those in an ordinary heronry, but appear not to have been specially studied. Note of fledged juveniles rendered as " krrick " or " kerkerker - - - " (G. Niethammer). *B.W.T.*

**Display and Posturing.**—Unlike Common Heron has a Bittern-like protective attitude with head and neck extended obliquely upwards in straight line. According to Naumann this is ordinarily assumed while whole length of tarsus rests on ground in what he describes as the normal resting position of the species, but it is certainly also adopted while standing (B. Beetham). Nestlings also have the extended neck posture. Nothing appears to be recorded of sexual displays. *F.C.R.J. & B.W.T.*

**Breeding.**—Usually breeds in colonies; nests sometimes close together, but also at times scattered and occur amongst those of other species, not necessarily concentrated in a limited area. In Europe generally in reed-beds, or cane-brakes, but also in marshes among *Cladium*, etc., and occasionally in low bushes (willows or tamarisks) or even in trees, sometimes 10 to 30 ft. high. *Nest.*—Usually built of dead reed-stems, carelessly arranged, not so high as that of Great White Heron: in eastern race said to be built by both sexes: when in bushes or trees, sticks and bits of branches used. *Eggs.*—Usually 4–5, sometimes 3 only, 6 not uncommon and 7 or even 8 recorded, but last number may be due to two females: light greenish-blue, often splashed with whitewash or stained but not marked: shape blunt oval: much like those of Common Heron but average smaller. 100 eggs (9 by E. Rey) average 56·32×40·90. Max.: 61·1×43·1 and 57×44·7. Min.: 50·2×39·5 and 51·5×38 mm. Average weight, 3·56 grams (3·10 to 4·05 gr., Rey). *Breeding-season.*—Occasionally early April in Spain, but often not till May: in middle Europe usually from early May. *Incubation.*—Eggs laid at intervals of about 3 days (O. Meylan), incubation sometimes from first egg: at other times apparently on completion of clutch (de Chavigny), by both sexes. Period between 24 and 28 days. *Fledging.*—Young fed by both sexes: parent's bill seized and drawn down, when food is regurgitated from crop and sometimes falls in nest: at others taken from bill or throat (*cf.* B. Beetham, *Home Life of Spoonbill*, etc.). Period: able to fly a little at six weeks (O. Heinroth), but independent at two months. Single-brooded. *F.C.R.J.*

**Food.**—Studied extensively by N. Vasvári and E. Moltoni: former gives results of 113 analyses of stomach contents and estimates that of these cases, as regard vertebrates, fish occurred in 52%, mammals in 24·7%, frogs in 22%, lizards in 5% and newts in 2%. Of invertebrates the most frequently represented were land Coleoptera (in 46%), water-beetles (in 18%) and larvæ in about 31% of cases, Odonata and larvæ in 33%, Orthoptera in 16%, Hemiptera in 28% and Hymenoptera in 12% (percentages refer to number of cases in which matter occurred, cases of mixed contents being counted more than once, and not to proportion of total material). Mammals (chiefly mole, water-vole, field-mice, shrews): birds (young of Great Crested Grebe): water-snakes (*Tropidonotus*): frogs (*Rana* and *Pelobates*): newts: fish (chiefly *Perca, Carassius, Scardinius, Leuciscus, Tinca, Cobitis, Anguilla, Alburnus, Esox* (pike) up to 11½ ins., *Cyprinus*, etc.): insects and larvæ include Orthoptera (*Gryllotalpa, Acridiidæ* and *Locustidæ*), Dermaptera (*Forficula*), Odonata (*Æshna, Libellula, Calopteryx, Agrion*), Hemiptera (*Naucoris, Notonecta*), Coleoptera (*Carabidæ, Dytiscidæ* (*Dytiscus, Hydroporus*), *Silpha, Hister, Nitidulidæ, Hydrous, Coccinellidæ* (*Micraspis*), *Elateridæ, Cantharis, Cassida, Donacia, Melasoma, Geotrupinæ, Melolontha, Curculionidæ*): Hymenoptera and Diptera. Also small Crustacea, Arachnida, Mollusca (water-snails), Myriapoda, etc. (see N. Vasvári, *Aquila*, 1929–30: E. Moltoni, *Rivista Ital. di Orn.*, 1936, p. 251). *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. Mostly April to Oct., very rarely winter. *England.*—Over eighty, chiefly E. coast to Yorks but most in Norfolk and Suffolk, more rarely S. and S.W. coast, and very rarely elsewhere. *Wales.*—One Pembroke, April, 1932; one Brecon. *Scotland.*—One E. Lothian, Oct., 1872; one Caithness, Sept., 1907; one stated obtained Aberdeen about 1872 is in Aberdeen Univ. Mus.; one seen Berwick, April, 1917. *Ireland.*—One Monaghan, prior to 1834; one 90 miles off W. coast April 5, 1936. *H.F.W.*

**Distribution Abroad.**—S. Palæarctic, Oriental and Ethiopian regions. Typical race breeds N.W. Africa (Marocco, Algeria, Tunisia), Portugal, Spain, Mallorca, France, Holland, Italy, has bred Germany, Austria, Hungary, Yugo-Slavia, Albania, Greece (Thessaly), Romania, Bulgaria, S. Russia (from 52° to Crimea and Caucasus): Transcaspia, Kirghiz Steppes to Turkestan and N. Persia. Also resident in many parts of tropical and S. Africa. Replaced by allied races in tropical Asia, *A. p. manilensis* (India, Ceylon, Burma, S. China and Malay archipelago and S. Riu Kiu Is.): in Madagascar (*A. p. madagascariensis*); and apparently in E. Asia (Ussuria). Typical race has also occurred in Switzerland, Belgium and Germany: also in N.E. Africa. Accidental in Norway, S. Sweden, Denmark, Canaries, Azores and Madeira. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head, crown and line down back of neck glossy-black (feathers of crest as in Common Heron but shorter—longest 140 mm.); sides of head and neck chestnut-buff, with narrow, somewhat broken, lines of black (formed by feathers partially black and buff) from gape to back of nape and down each side of neck for whole length; mantle dark oily-brown, but sometimes paler and greyer, feathers of lower mantle with elongated and greyer tips with grouped rami as in Common Heron; upper scapulars same structure but larger and tips mostly pinkish-chestnut; lower scapulars normal and colour as mantle; back, rump and upper tail-coverts as mantle but usually rather greyer; (*under-parts*) chin and cheeks white; centre of throat rather paler than sides of neck, lower half with feathers half black and half buff; feathers of lower-throat and upper-breast with grey bases and rest buffish-white with black edgings and some chestnut giving somewhat variegated appearance to these elongated, pointed feathers; breast deep chestnut with some partially black feathers, belly with more black; under tail-coverts black with white bases; tibia chestnut-buff; flanks and axillaries brownish-grey; lowest series of under wing-coverts same but rest chestnut; *tail-feathers* as rump; *primaries* and *primary-coverts* black with more or less grey tinge, *secondaries* greyer; *greater coverts* with outer webs brownish-grey and inner webs darker; *median* and *lesser coverts* brownish-grey usually with chestnut tinge on edges of feathers, uppermost series of lesser coverts edged chestnut, and feathers at point of wing entirely chestnut. This plumage is acquired by complete moult June to Nov. (occasionally later, one Feb.). A spring moult confined to body-feathers appears to take place in April, but only two of a number of March and April birds examined were in moult.

NESTLING.—Down of whole crown dark brown at base with long, white bristle-like tips without rami, giving conspicuous crested appearance as in Common Heron but down shorter and less plentiful, rest of down normal but long, that of upper-parts blackish-brown, of under-parts white. Sides of head round eyes, chin, throat and whole of neck nearly to base bare as also is centre of breast and belly, sides of back and middle of mantle—down much sparser than in Common Heron and darker on upper-parts.

JUVENILE.—(*Upper-parts*) fore-head and fore-part of crown black, rest of crown and back of neck pale chestnut (feathers of crest elongated and narrow but not nearly so long or pointed as in adult and no very long feathers); whole mantle and all scapulars and *wing-coverts* dark brown broadly edged and tipped rufous-buff; back, rump and upper tail-coverts uniform dark grey-brown; (*under-parts*) cheeks, chin and middle of upper-throat white; rest of throat and breast with feathers half brown-black and half buff; belly, tibia and under tail-coverts pale buff with few brown markings; flanks and axillaries dark grey-brown; under wing-coverts brown-grey, broadly tipped buff; *tail*, *primary-coverts* and *primaries* brown-black, *secondaries* same but innermost edged rufous as wing-coverts.

FIRST WINTER AND SUMMER.—Much like juvenile but feathers of crest rather longer and more pointed and darker chestnut; those of mantle and especially upper scapulars with rufous tips elongated and separated but not nearly so much as in adult; those of upper-breast rather longer and more pointed than in juvenile. The juvenile body-plumage, varying number of wing-coverts and innermost secondaries are moulted Nov.-April but not wing- or tail-feathers.

SECOND WINTER AND SUMMER.—Much like adult but some chestnut feathers mixed with black on back of neck; crest-feathers shorter; elongated feathers of mantle more rufous-buff and less pinkish and those of upper-breast not so finely pointed; breast and belly not quite so dark; *lesser* and *median wing-coverts* broadly edged rufous. This plumage is acquired by complete moult commencing sometimes May, but often not complete until Nov.

MEASUREMENTS AND STRUCTURE.—♂ wing 330–380 mm., tail 105–132, tarsus 115–130, bill from feathers 115–135 (12 measured). ♀ wing 290–355, bill 105–125. Primaries (1st vestigial one not included): 2nd, 3rd and 4th longest but 4th often 5 mm. shorter, 1st usually 5–10 shorter, occasionally as long, 5th 5–25 shorter, 6th 25–40 shorter, 7th 45–60 shorter; 2nd–4th emarginated outer and 1st–3rd inner webs. Middle toe with claw 124–137 mm. Rest of structure as Common Heron.

SOFT PARTS.—Bill brownish-yellow, yellower on lower mandible and tip and shading to greenish at base and lores; legs and feet dark brown in front, yellowish behind and on bare part of tibia (juv. greener); iris pale yellow. *H.F.W.*

**Characters and allied forms.**—Smaller size, rufous-buff neck, darker upper-parts and chestnut under-parts distinguish adult from Common Heron and rufous neck and edgings to feathers juvenile. *A. p. manilensis* (India, China) has elongated feathers of mantle and scapulars paler grey and of upper-breast whiter. Other forms have been described. *H.F.W.*

### Genus **EGRETTA** Forst.

EGRETTA Forster, Synopt. Cat. Brit. B., p. 59 (1817—Monotype: *E. garzetta*).

Plumage entirely white, or in some forms varying from white to slate-grey. Bill slenderer than in *Ardea*. On back elongated feathers with hair-like thin ends and decomposed webs, this nuptial " train " reaching beyond tips of wings.

*PLATE 74.*

## 291. THE GREAT WHITE HERON—Egretta alba alba (L.)

ARDEA ALBA Linnæus, Syst. Nat., ed. x, i, p. 144 (1758—Europe. Restricted typical locality: Sweden).
*Ardea alba* Linnæus, Yarrell, iv, p. 177; Saunders, p. 371.
*Egretta alba alba* (L.), Pract. Handb., ii, p. 205.

**Habitat.**—Frequents reedy swamps, meres, river-banks, deltas, etc., breeding birds being confined to neighbourhood of dense reed-beds, in which nests are built, but also locally common (chiefly non-breeders) far from reed-beds, *e.g.* bare shores of Red Sea. Appears generally to avoid neighbourhood of trees, though this is not the case with other races of the species. *B.W.T.*

**Field-characters and General Habits.**—Present species and Little Egret are only herons with *pure white plumage*, though Squacco (*q.v.*) looks mainly white in flight. At some distance in swamp with nothing available for comparison, confusion with Little Egret is perfectly possible, but Great White Heron is actually *much bigger as well as proportionately slimmer and less compact-looking bird*. It also looks slimmer and narrower winged in flight apart from size difference. Other differences are: absence of long crest, *feet blackish*, instead of yellow, legs yellowish at sides, black in front; *bill yellow* (*instead of black*) *outside breeding-season*. Breeding birds have bill largely black, though some individuals show much yellow even in breeding-season (F.C.R.J.). Total length *c.* 35 ins.; body *c.* 15 ins.

Gait, etc., as other herons. Though frequenting mostly reedy localities and always breeding in high reeds, is not a reed-haunting bird in sense that Bittern or even Purple Heron is, feeding freely on the borders of open water like Common Heron. Appears rarely to perch in trees, though other races do so freely and indeed nest in them. Sometimes singly, but more often in parties and where common (*e.g.* Volga delta) in flocks of as many as 200 after breeding-season. Does not associate much with other species, usually breeding in separate colonies, though single nests may be found near Common and Purple Herons (F.C.R.J.). Other races generally roost in trees, large numbers often congregating at favoured spots ; nothing seems to be recorded about roosting of present race, which must evidently often do so on ground, in reeds, etc. *B.W.T.*

**Voice.**—A very silent bird. R. B. Lodge during prolonged watching heard only low croakings from adults, though young when hungry and being fed are noisy, maintaining quick chatter much like other young herons. *B.W.T.*

**Display and Posturing.**—In case of American race (*E. a. egretta*) nest-relief is accompanied by much display of plumage, raised wings and elevated plumes, and loud croaking (A. C. Bent). In same race Audubon describes a display taking place as early as December while birds were in flocks ; males strutted round females, swelling their throats, emitting gurgling sound and raising plumes till they were almost erect. *F.C.R.J. & B.W.T.*

**Breeding.**—Though often breeding in colonies, nests are usually some distance apart, and not associated with other species : generally in extensive reed-beds, and standing in water up to 3 or 4 ft. deep. Nests have also been recorded on pine trees and in willow-scrub. *Nest.*—Similar in type to that of Common and Purple Herons in same surroundings but larger, built of dead stems of reeds and standing about 3 ft. out of water. *Eggs.*—3, or more commonly 4, sometimes 5 : 6 once recorded : pale blue : shape variable, sometimes fusiform : paler on an average than those of Common and Purple Herons and larger. Average of 91 European eggs, 61·49×42·35. Max. : 68·4×44·7 and 61×45·6. Min. : 53·9×42·5 and 61·3×40 mm. Average weight, 4·98 grams (A. Bau). *Breeding-season.*—Occasionally as early as beginning of April, but generally during last fortnight of month. *Incubation.*—By both sexes (O. Steinfatt). Period probably 25–26 days (K. Warga). *Fledging.*—Young fed by both sexes. Period about six weeks. Single-brooded, but some birds do not lay till June. *F.C.R.J.*

**Food.**—Varies to some extent according to season : in wet years mainly fish, aquatic insects and larvæ, frogs, tadpoles, etc., but in dry seasons takes small mammals (chiefly field-mice and voles), land insects, lizards and probably young birds (K. Warga). Fresh-water Mollusca and worms also recorded. Insects taken are chiefly Orthoptera, Hemiptera and Coleoptera. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Very rare vagrant. About seven authentic—three Yorks (1825, 1834, summer, 1868), one Cambs (May or June, 1849), one Notts, one E. Lothian (June, 1840), one Perths (May, 1887) (*cf.* Saunders, p. 371, and *Brit. B.*, i, p. 347). *H.F.W.*

**Distribution Abroad.**—World-wide : Palæarctic, Ethiopian, Oriental, Australasian and Neotropical regions. Typical race breeds in E. Europe, locally in Austria, Hungary, Yugo-Slavia, Albania, Romania, Macedonia, S.E. Russia (Volga delta, Caucasus, etc.). Also Asia Minor, Persia, Turkestan and Kirghiz Steppes to S. Siberia, N. China and N. Japan. Replaced by allied races in tropical and S. Africa (*E. a. melanorhyncha*): in India, tropical China and S. Japan through Indo-Australian Is. to Australia (*E. a. modesta*), New Zealand (*E. a. maoriana*) and temperate and tropical America (*E. a. egretta*). Northern (typical) birds migrate to N. Africa and S.W. Asia, occurring in middle and S. Europe, north to Germany, Poland, etc. Accidental in Sweden, Baltic states, Holland, Belgium, France, S. central Russia, Switzerland, Mallorca, Malta, Azores, Canaries. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. SUMMER.—Whole plumage white. Feathers of crown slightly elongated and loose but no very long crest-feathers; feathers of upper-breast and base of neck long and with separated rami on tips and edges; upper scapulars enormously elongated (320–450 mm. long) with very long, loose rami placed widely apart and drooping from shaft. This plumage is acquired by complete moult from Dec. to May. WINTER.—A complete moult appears to take place from Aug.-Nov. New plumage like summer, but scapulars are more or less normal with separated rami on tips and edges but not greatly elongated as in summer nor with very long and widely separated rami.

NESTLING.—Down white, long with silky hair-like tips, that of crown rather stiffer (but finer and less bristle-like than in Common Heron) giving very conspicuous crested appearance, rest of down shorter, especially on neck and under-parts. Lores, round eyes, whole of chin and upper half of throat, most of back of neck, centre of upper-breast bare.

JUVENILE.—Whole plumage white as in adult but feathers of crown and upper-breast shorter and scapulars normal.

FIRST WINTER.—As adult winter but tips of scapulars with slightly less long and less separated rami. The juvenile body-plumage is moulted Aug.-Nov. but not wing- or tail-feathers. FIRST SUMMER.—A female (May) is like winter adult and may possibly be first summer if not an adult which has missed spring moult.

MEASUREMENTS AND STRUCTURE.—♂ wing 410–465 mm., tail 140–185, tarsus 170–215, bill from feathers 110–135 (12 measured). ♀ wing 400–450, bill 110–132. Primaries (1st vestigial one not included): 2nd and 3rd usually longest, 4th as long or 10 mm. shorter, 1st usually 10–15 shorter, 5th 20–30 shorter, 6th 40–60 shorter, 7th 70–90 shorter; 2nd to 4th emarginated outer and 1st to 3rd inner webs. Middle toe with claw 109–126 mm. Rest of structure as in Common Heron but tip of upper mandible not so sharply pointed and notch more distinct.

SOFT PARTS.—Bill black, base yellow (ad. summer), all yellow (ad. winter and juv.); lores and round eyes green; legs and feet black-brown, sides yellowish, toes greenish-black; iris yellow. *H.F.W.*

**Characters and allied forms.**—Large size, pure white colour, absence of long crest-plumes in winter, yellow bill distinguish it from other British herons. Other forms occur in Africa, India, New Zealand and America. *H.F.W.*

*PLATE 74.*

## 292. THE LITTLE EGRET—Egretta garzetta garzetta (L.)

ARDEA GARZETTA Linnæus, Syst. Nat., ed. xii, i, p. 237 (1766—" Habitat in Oriente." Restricted typical locality N.E. Italy (Grant and M.-Praed, *Bull. B.O.C.*, liii, p. 194)).
*Ardea garzetta* Linnæus, Yarrell, iv, p. 182; Saunders, p. 373.
*Egretta garzetta garzetta* (L.), Pract. Handb., ii, p. 206.

**Habitat.**—Frequents open marshes and flood-lands and open shores or sand-banks of rivers, streams and lagoons, except for immediate purpose of nesting, for which it resorts to woods or thickets of willow, tamarisk, etc., and sometimes more isolated trees, on banks of rivers and lagoons and in marshes or inundated country, as well as on quite dry ground in marshy districts. In Egypt it feeds largely in crops, and both here and in the east is not averse to breeding in frequented places. *B.W.T.*

**Field-characters and General Habits.**—An obvious heron with slender neck and *pure white plumage*. For distinctions from Great White Heron, see that species. Amongst birds of about same size can only be confused with Buff-backed Heron, which looks equally white at little distance, and (in flight only) with Squacco, which, though head and body are fawn-coloured, looks mainly white on the wing. *Black bill and legs and yellowish feet* are characters to be looked for in flight and can be seen with glasses at considerable distance. When settled (except when at rest with neck withdrawn) much slenderer, sinuous neck is alone sufficient distinction from Buff-backed, apart from other differences, for which see that species. Total length *c.* 22 ins.; body *c.* 11 ins.

Flight and attitude of rest, with head retracted in both cases, gait and manner of feeding are those of a typical heron; wings rather rounded and flight leisurely, sometimes gliding for short distance. Usually in parties or small flocks. At breeding places associates with Buff-backed, Squacco and Night-Herons, also Glossy Ibis, etc. Roosts socially in trees. *B.W.T.*

**Voice.**—Generally silent except at breeding places, where notes seem to be much like those of other herons. In colonies I have visited I have not been able to separate notes of this species from those of more numerous Night- or Buff-backed Herons. Seebohm describes notes as " ak," " ark " or " ork." *B.W.T.*

**Breeding.**—Breeds in colonies, generally together with other species such as Buff-backed, Night- and Squacco Herons, Glossy Ibis, etc. *Nest.*—Varies according to site: some colonies on tops of tamarisk bushes in marsh, when nest is a flimsy structure of twigs, others on huge cork-oaks in open park-like country (Spain): also in coniferous woods and among alders and other trees growing in water (S. France): in alder thickets among reed-beds (Hungary): in big trees (Egypt): in bamboo clumps, reed-beds or big trees (India). Built by both sexes. *Eggs.*—Usually 4, occasionally 3 or 5: 6 recorded: light greenish-blue, no gloss, more frequently pointed or elongated ovoid than in Buff-backed Heron. Average of 100 eggs (30 by E. Rey), 46·59×33·78. Max.: 55×34·2 and 47·5×36·8. Min.: 42×33·5 and 48×31·1 mm. Average weight, 1·85 grams (E. Rey). *Breeding-season.*—Varies according to season from late April to mid-May (Spain): in the Camargue some have full clutches in late April. *Incubation.*—Eggs laid at 24 to 48 hours interval, normally 2 days in confinement (O. Steinfatt): incubation begins with 1st egg and both sexes take part (*id.*). Period 21–25 days. *Fledging.*—Young fed by both parents: by seizing the bill and pulling it down: food is regurgitated into bill and taken by young from thence. Period (?). Probably single-brooded normally. *F.C.R.J.*

**Food.**—Continental records include small fish (tench (*Tinca vulgaris*), also *Cyprinus carpio*, *Cobitis*, *Eupomotis*, etc.), small snakes, frogs (*Rana esculenta*), lizards, worms, Crustacea (*Apos cancriformis*, etc.); fresh-water Mollusca and insects (Odonata larvæ, Hemiptera (*Notonecta*), Coleoptera (larvæ of *Dytiscus* and *Hydrophilus*)). Aquatic Mollusca recorded in winter-quarters in S. Africa (*Physopis africana* and *Succinea delalandi*): also fish, lizards, frogs, Crustacea and aquatic insects. *F.C.R.J.*

**Distribution.**—*England and Wales.*—Very rare vagrant. Several recorded, but Saunders admitted only one—Countess Weir, Exe (Devon), June 3, 1870 (*Zool.*, 1870, p. 2308)—as thoroughly authentic. Others recorded from Suffolk (1879), Cambs (two about 1849) and Yorks (1826 and 1840) may be genuine. One recorded seen Axmouth (Devon), Aug. 1930 may have been an escape (*Brit. B.*, xxiv, pp. 131–2), as may have been one seen Milford Haven (Pembs), May 25, 1938 (*op. cit.*, xxxii, p. 84). *H.F.W.*

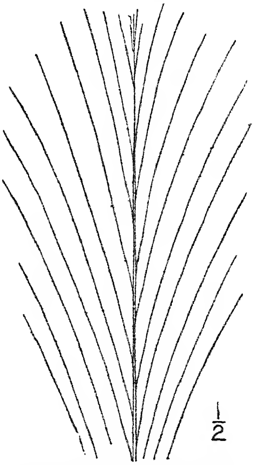
**Distribution Abroad.**—S. Palæarctic, Ethiopian and Australasian regions. Typical race breeds in Europe in Portugal, S. Spain, S. France, W. Italy, Czecho-Slovakia, Hungary, Yugo-Slavia, Albania, Bulgaria, Romania, S. Russia (Kherson, Poltava, Ekaterinoslav Govts. to Astrakhan and Caucasus). Also N. Africa (Marocco to N. Tunisia, Egypt): Syria, Asia Minor, Transcaspia, Turkestan, Persia to India, China, Hainan and Japan, and in E. and S. Africa. Replaced by allied races in Madagascar (*E. g. dimorpha*), Assumption Is. (*E. g. assumptionis*), Malay archipelago (*E. g. nigripes*) and Australia to Papua (*E. g. immaculata*). European birds migrate to Mediterranean and its islands: N. Africa and S.W. Asia: occurring north to N. France, Belgium, Holland, Germany, Poland and Baltic states. Accidental in Azores, Canaries and Madeira. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. SUMMER.—Whole plumage white. Two very long crest-feathers (when fully grown 140–160 mm.), very narrow and pointed, of very close structure, rami being long and lying close to shaft; on upper-breast a number of similar feathers but their basal portions with the rami separated and spread, not close to shaft; upper scapulars and in middle of mantle between scapulars large tuft of very long feathers (about 200 mm.) with very long, loose rami placed widely apart and drooping from shaft (the "egret" or "osprey" plumes of milliners). This plumage is acquired by a complete moult from Jan. to April. WINTER.—A complete moult takes place June to Nov. (occasionally May and Dec.). New plumage like summer but without long crest-plumes and with fewer and rather shorter loose, drooping plumes on scapulars and mantle.

NESTLING.—(Not examined.)

JUVENILE.—Whole plumage white as in adult but with no special plumes, feathers of back of crown and upper-breast being rather long and rather loosely constructed but otherwise normal.

FIRST WINTER.—Like juvenile but feathers of upper-breast longer and some with narrow closely set tips but very much shorter than in adult; feathers of scapulars and mantle rather long and rami separated at tips but not greatly elongated nor placed widely apart as in adult. The juvenile body-plumage is moulted Aug.-Nov., but not wing- or tail-feathers. FIRST SUMMER.—After spring moult appears to become like adult, but some birds without crest-plumes but otherwise like adult summer may possibly be first summer.



The Little Egret (*Egretta g. garzetta*). Tip of a scapular plume adult, summer.

MEASUREMENTS AND STRUCTURE.—♂ wing 260–295 mm., tail 90–110, tarsus 100–110, bill from feathers 85–92 (12 measured). ♀ wing 250 (one 240)–282, bill 78–90. Primaries (1st vestigial one not included): 2nd and 3rd longest, 1st and 4th sometimes as long but usually 5–10 mm. shorter, 5th 10–25 shorter, 6th 25–35 shorter, 7th 40–55 shorter; 2nd to 4th slightly emarginated outer and 1st and 2nd inner webs. Middle toe with claw 68–75 mm. Rest of structure as in Common Heron but tip of upper mandible not so sharply pointed and notch more distinct.

SOFT PARTS.—Bill and lores black, base of lower mandible and round eyes greenish-grey; legs black, toes and extreme base of tarsus yellow; iris yellow.
*H.F.W.*

**Characters and allied forms.**—Pure white plumage, black bill and legs and yellow feet and small size distinguish it from other British herons. *E. g. nigripes* (Malay archipelago) is similar but with black toes, and *E. g. immaculata* (Australia, Papua) is smaller. C. H. B. Grant and C. W. Mackworth-Praed (*Bull. B.O.C.*, liii, pp. 189–196, 245–6; liv, pp. 73–75; lix, pp. 24–26) give reasons to support their view that the Reef-Herons from N., E. and S. Africa are of one subspecies with numerous colour phases (white through greys to blackish-slate), and as the white phase differs in no way from the European form they unite these birds with it and differentiate as subspecies *E. g. dimorpha* (Madagascar) as larger, and *E. g. assumptionis* (Assumption and Aldabra Is.) as similar to last but with longer bill. In Europe only white birds are known unless we accept the somewhat doubtful record of a grey example having been seen and shot but not recovered in Bulgaria in May, 1869. *H.F.W.*

## Genus **ARDEOLA** Boie

ARDEOLA Boie, Isis, 1822, i, p. 559 (Monotype: *A. ralloides*).

Smaller birds than *Ardea* and *Egretta*, though *E. garzetta* not very much larger, tarsus shorter, scutate in front. Wings entirely or chiefly white, otherwise much white in plumage. 5 species, one in at least 2 subspecies, southern Europe, Africa and Asia.

*PLATE 74.*

## 293. THE BUFF-BACKED HERON—Ardeola ibis ibis (L.)

ARDEA IBIS Linnæus, Syst. Nat., ed. x, i, p. 144 (1758—Egypt).
*Ardea bubulcus* Audouin, Yarrell, iv, p. 187; Saunders, p. 375.
*Ardeola ibis ibis* (L.), Pract. Handb., ii, p. 208.

**Habitat.**—Often resorts to marshes or water-side for breeding purposes, as well as to trees, woods and even parks or gardens on dry ground, but is otherwise much less aquatic than other herons, frequenting indifferently dry grasslands or marshes wherever there are cattle or (in Africa) big game, and also feeding on arable land. *B.W.T.*

**Field-characters and General Habits.**—A small white heron (size of Little Egret) with tuft of *elongated pinkish-buff feathers on crown and in summer also on mantle*, but in winter latter are lost and former are paler, while even in summer the pale buff plumes are inconspicuous at a little distance. Hence can be confused with Little Egret, which often associates with it at breeding places, and in flight also with Squacco. Differs, however, from Egret in *less slender and shorter-looking neck* and from both in *yellow bill*, Egret's being black and that of Squacco also mainly dark. Legs are stated to be dull yellow outside breeding-season, and apparently authoritative descriptions speak of breeding birds (at least in Africa) as having " yellow " or " orange-yellow " legs, but in Spanish birds in breeding-season legs are dull purplish-red, looking blackish at distance. Base of bill also becomes reddish in breeding-season. Legs of immature birds are blackish and plumage resembles winter adult, while juveniles have no buff at all. *Habitual association with cattle in fields is characteristic.* Total length *c.* 20 ins.; body *c.* 11 ins.

Flight, gait, etc., as Little Egret. Very sociable, nearly always in flocks or parties, walking about amongst grazing cattle in search of insects disturbed by the animals and sometimes perching on their backs in search of parasites (this habit apparently more prominent in case of big game than with domestic cattle). Roosts gregariously in trees. *B.W.T.*

**Voice.**—At breeding places birds have a variety of croaking and guttural notes. A note said to be like the bleating of a sheep is also described, and W. Farren records a low crooning note at nest-relief. *B.W.T.*

**Display and Posturing.**—At nest-relief birds have been observed to lay necks along and across one another, so that bills touched each other's bodies, remaining thus for few seconds (W. Farren). No other display is recorded. *F.C.R.J. & B.W.T.*

**Breeding.**—Very sociable, breeding in colonies, sometimes of considerable size, either alone or more often mixed with other species, such as Little Egret, Glossy Ibis, etc. *Nest.*—Differs according to site: sometimes on tamarisk bushes in marsh, at other times in dense reed-bed near open water, or among branches of alders, sallows, etc., growing in water, or big cork-oaks on dry ground: also recorded as nesting on rocky islets, and in Egypt commonly in big trees in towns: built by both sexes (G. K. Yeates) of material at hand, small sticks and twigs or dead reeds and aquatic plants. *Eggs.*—Usually 4 or 5, 6 occasionally found: colour very pale blue, sometimes almost "skim-milk" tint, blunt and broad ovoid in shape. Average of 61 eggs (19 by E. Rey) from Spain and Marocco, 45·66×34·22. Max.: 49·8×35·8 and 49·3×36. Min.: 41·2×33 and 48·9×32·5 mm. *Breeding-season.*—Variable, but in colony birds breed about same time: sometimes late in April, but more often in first half of May in Spain. *Incubation.*—By both sexes: sits spasmodically from first egg (Yeates). Period: given as 21–24 days in eastern race. *Fledging.*—Young fed by both parents. Period (?). Said to be double-brooded in Egypt (W. Raw): apparently single-brooded in Spain. *F.C.R.J.*

**Food.**—Feeds largely on insects disturbed by grazing cattle and removes many parasites from domestic animals, especially cattle-ticks (*Acari*). G. L. Bates records 26 females and 42 males *Hyalomma ægyptium* (*Ixodidæ*) from camel. Also eats frogs (11 in one bird) and lizards. Insects taken include Orthoptera (*Gryllotalpa, Acridiidæ, Locustidæ,* etc.): Hemiptera (*Naucoris, Notonecta,* etc.): Lepidoptera (larvæ): Coleoptera (larvæ of water-beetles) and Diptera (larvæ). *F.C.R.J.*

**Distribution.**—*England.*—Immature female near Kingsbridge (Devon), end Oct., 1805 (*ut supra*). Male, Breydon Marshes (Norfolk), Oct. 23, 1917 (F. W. Smalley, *Brit. B.*, xi, p. 146). [One recorded Martock (Somerset), Jan. 28, 1909, evidence insufficient. *Zool.*, 1915, p. 318; *Brit. B.*, x, p. 70.] *H.F.W.*

**Distribution Abroad.**—Locally in S.W. Palæarctic, Ethiopian and Oriental regions. Typical race breeds in N. Africa (Marocco to Tunisia and Egypt), also in tropical Africa, Madagascar and various Ethiopian Is. In Europe only in S. Spain and Portugal: in Asia in S.W. Arabia, Syria, Transcaucasia and N. Persia. Replaced by an allied race (*A. i. coromanda*) in India, Ceylon, Burma, Siam, S. China, Korea, S. Japan, Formosa, Hainan and E. Malay Archipelago. Occurs on coasts of Mediterranean and Black Seas and in Iraq. Accidental in Denmark, Hungary, S.E. Russia, Canaries and Madeira. *F.C.R.J.*

**Description.**—ADULT MALE. SUMMER.—*Whole plumage* white, except for long tufts on *crown*, *lower-throat* and centre of *mantle* which are pinkish-buff to deep orange-buff (these feathers very long with enormously elongated and separated rami, lying almost parallel to shaft). This plumage is acquired by complete moult March-May. WINTER.—A full moult again takes place July-Nov. (sometimes Dec.), after which bird is as in summer but feathers of *crown* are paler and not so long, while those of *lower-throat* and centre of *mantle* are mostly white with slight creamy-buff tinge, slightly elongated and separated at tips but quite unlike greatly elongated feathers of summer.

ADULT FEMALE. SUMMER.—As adult male. WINTER.—As adult male winter but feathers of centre of *mantle* and *lower-throat* shorter, white and almost normal in structure.

NESTLING.—Down like that of Great White Heron.

JUVENILE.—Like adult winter female but white on *crown* and feathers normal as well as on centre of *mantle* and *lower-throat*.

FIRST WINTER. MALE AND FEMALE.—Like adult winter female. The juvenile body-feathers and wing-coverts are moulted Sept.-Dec. (occasionally Jan.) but not wing- or tail-feathers. FIRST SUMMER.—After complete moult becomes as adult but moult is often rather later.

MEASUREMENTS AND STRUCTURE.—♂ wing 233–253 mm., tail 70–90, tarsus 70–87, bill from feathers 52–60 (12 measured). ♀ wing 233–247, bill 52–58. Primaries (1st vestigial one not included): 2nd and 3rd longest, 1st and 4th as long or 5 mm. shorter, 5th 10–20 shorter, 6th 25–45 shorter; 2nd to 4th emarginated outer and 1st and 2nd slightly inner webs. Middle toe with claw 71–81 mm. Rest of structure as in Common Heron.

SOFT PARTS.—Adult summer (end April-May).—Bill yellow shading to vinous-pink or reddish towards base; bare skin round eye and lores bright violet-pink; legs dull vinous-red shading to dark brownish on feet; iris bright pinkish-red to yellow (B.W.T.). Adult winter, juv. and 1st winter.—Bill and iris yellow; legs and feet greenish-brown or greenish-black, tibia and soles yellowish. *H.F.W.*

**Characters and allied forms.**—White plumage, yellow or reddish not black bill and uniform buff tufts of feathers distinguish this species from other British herons. *A. i. coromanda* (India, S. China, S. Japan) adult in summer has feathers of crown, lower throat and mantle rusty-buff rather than pinkish and has similar feathers on chin and throat, and more of tibia is bare and tarsus is often longer than in typical form, but adults in winter are difficult to distinguish unless they have buff-feathers on throat and immature birds are doubtfully distinguishable.[1] *H.F.W.*

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[1] A considerable number of *A. i. coromanda*, usually called the Indian Cattle-Egret, have been released by the Zoological Society each year since 1931 at Whipsnade, and a few were also released in 1930 by Mr. A. Ezra at Cobham, Surrey. These birds have wandered in all directions and have been reported from time to time in many parts of the country as far apart as Devon, Somerset, Monmouth, Wiltshire, Leicester, Notts, Merioneth, Kent, Essex, Cambridge, Norfolk, Lincs, Perth, and even Iceland. As immature birds of this race are extremely like the European bird these releases have caused great confusion. In recent years liberated birds have been ringed "Zoo, London." Some have also been released (1929 and 1938) at the Dublin Zoo. *H.F.W.*

*PLATE 74.*

## 294. THE SQUACCO HERON—Ardeola ralloides (Scop.)

Ardea ralloides Scopoli, Annus 1 Historico-Natur., p. 88 (1769—Carniola).
*Ardea ralloides* Scopoli, Yarrell, iv, p. 191 ; Saunders, p. 377.
*Ardeola ralloides* (Scop.), Pract. Handb., ii, p. 210.

**Habitat.**—Much as Little Egret (*q.v.*), but perhaps likes more cover. *B.W.T.*

**Field-characters and General Habits.**—At rest appears a *predominantly fawn-coloured bird* with long feathers of head streaked pale buff and blackish, and can hardly be confused with any other species. This contrasts strikingly with appearance in flight, when *white wings* (largely concealed by mantle feathers when at rest) and tail make it look predominantly white, while at distance it may even give impression of being wholly so, though at reasonably close range warm buff mantle and dingy-looking streaked head are usually fairly obvious. In winter mantle is browner and whole neck streaked blackish. Legs yellowish-green, bill blackish, pale greenish at base below. Young much like winter adults. When settled neck looks thick, merging more or less gradually into body and often giving a rather bittern-like appearance. Total length *c.* 18 ins. ; body *c.* 9 ins.

In most of its European breeding places odd pairs or at most comparatively small numbers breed amongst Night-Herons and Egrets, and several observers in Africa describe it as usually seen singly or in pairs, but in some places where numerous is stated to be markedly gregarious. Habits much as Little Egret, but more inclined to skulk in reeds or cover, being rather sluggish by day and becoming active towards evening. Perches quite freely in trees and bushes. *B.W.T.*

**Voice.**—Silent by day except at breeding colonies, but the harsh and shrill " karr " can often be heard at dusk especially in the breeding-season (R. Meinertzhagen). *B.W.T.*

**Breeding.**—Generally found breeding in colonies of other species, such as Little Egret, Glossy Ibis, Buff-backed Heron or Night-Heron, in scattered pairs and in small numbers. *Nest.*—Differs according to surroundings : it may be a flimsy structure of twigs on tamarisk bushes ; or a more substantial one in trees (conifers or alders, sallows, etc.), or built of sedges and bits of reed in open marsh or reed-bed. *Eggs.*—4–6, rarely 7, much smaller than other European herons' eggs : light greenish-blue, slightly ovoid in shape. Average size of 100 eggs (34 by A. Bau, 25 by E. Rey), 38·37×28·62. Max. : 41·6×31·5. Min. : 35×28·2 and 36·2×27 mm. Average weight 1·04 grams (Rey). *Breeding-season.*—Rather late ; from about 2nd week May in S. Spain, more often in June : yet young already hatched at beginning June, Hungary. Apparently erratic and dependent on presence of other species. *Incubation.*—By both sexes : period not known. *Fledging.*—Young fed by both sexes. Period (?). Single-brooded. *F.C.R.J.*

**Food.**—British records include shrew (*Sorex*), fish (14 headless small roach (*Leuciscus*) in one stomach) and insects (Coleoptera). Food investigated abroad by R. Poncy and E. Moltoni : chiefly insects : Orthoptera (*Gryllotalpa*, grasshoppers and crickets), Ephemeroptera (larvæ), Odonata (*Libellulidæ*), Hemiptera (*Naucoridæ, Notonectidæ*), Coleoptera (*Agabus, Colym-*

*betes, Dytiscus, Gyrinus, Coccinella, Hydrophilus, Helochares, Berosus, Helophorus*), Diptera (*Tipulidæ*), etc.: also frogs (*Rana esculenta*) in fair numbers: small fish (*Tinca vulgaris, Eupomotis gibbosus*, etc.), earth-worms (*Lumbricus*), fresh-water Mollusca, Crustacea (small crabs), Acari: as well as some vegetable matter (grass). *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. *England.*—Over seventy. Recorded from many counties, but chiefly Suffolk, Norfolk, Sussex, Devon and Cornwall. Mostly May and June, several July, and one or two in most other months. *Wales.*—Denbigh, Montgomery, and borders of Brecon and Radnor. *Scotland.*—Three and one seen. *Ireland.*—Ten (chiefly S. coast). *H.F.W.*

**Distribution Abroad.**—S. Palæarctic and Ethiopian regions. Breeds in Europe in S. Portugal, S. Spain, S. France, N.W. Italy, Yugo-Slavia, Hungary, ? Poland (very rare), Albania, Romania, Bulgaria and S. Russia (Ekaterinoslav, Taurida and Astrakhan Govts., Caucasus). Also Asia Minor, Syria, Iraq, Persia, Transcaspia, Turkestan, Amu-Darya, and in Africa from N. Marocco to Tunisia, also tropical and S. Africa. European birds migratory: occurring N. France, Belgium, Holland, Germany, Denmark, Austria, Czecho-Slovakia, Switzerland, E. Russia (Perm Govt.), and on passage in Mediterranean region. Casual Azores, Madeira and Canaries. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—(*Upper-parts*) whole crown, back and sides of neck pale yellow-buff, feathers with brown-black stripes along each side, those on sides of neck browner and less broad than those on crown and back of neck, feathers of crown narrow and elongated, and those of back of crown and nape greatly elongated, narrow and pointed and whiter not so buff, forming long crest; mantle, scapulars and innermost secondaries pink-brown, some outer scapulars golden-buff (tips of feathers of upper-mantle with separated rami and feathers of lower-mantle and scapulars long with much elongated and separated rami, but not so much so as in Buff-backed Heron); back and rump white; (*under-parts*) chin and centre of throat white; sides of throat and long feathers of lower-throat golden-buff striped black-brown; rest of under-parts white; *tail* and *wing-feathers*, except brownish *innermost secondaries*, white: *wing-coverts* white, tinged more or less golden-buff. This plumage is acquired by full moult June-Dec. SUMMER.—Feathers of body and wing-coverts moult Jan.-May and varying number of brown inner secondaries but not rest of wings or tail. New plumage like winter but (*under-parts*) feathers of throat, sides and base of neck and long feathers of lower-throat and upper-breast golden-buff unstriped; (*upper-parts*) mantle much pinker, less brown; scapulars golden-buff, and renewed innermost secondaries more buff and less brown; crest-feathers still longer than in winter.

NESTLING.—(Not examined.) Collingwood Ingram gives for newly hatched, thinly covered with white down, buff tinge on shoulders; on head distinct crown of coarse, wiry down of brownish-buff.

JUVENILE.—(*Upper-parts*) no long crest-feathers and scapulars not with elongated separated rami; crown black-brown, feathers with yellowish-white shaft-streaks and edges at base; neck and sides of head and throat pale yellow-cream with narrow dark brown stripes; mantle rather more earth-brown than winter adult, scapulars same with yellowish centres at tips of feathers; back, rump and upper tail-coverts and *under-parts* white with tinge of yellow-buff on tibia; *tail* and *wing-feathers* white, mottled brown at tips and along outer webs of *primaries*, which also have brown shafts, *innermost secondaries* brown; *primary-coverts* more or less mottled brown and shafts brown at base; *wing-coverts* pale yellow-cream with pale mottled-brown stripes along edges chiefly of outer feathers.

FIRST WINTER.—(*Upper-parts*) no very long crest-feathers, and rami of scapulars only a little elongated and separated ; crown, neck and throat much like adult but stripes not so blackish and buff paler and more creamy ; mantle and scapulars more rusty-brown, not so earth-coloured as juvenile nor so pinkish as adult, and scapulars usually with narrow yellow-buff central streaks at tip. The juvenile body-plumage is moulted July-Dec., but not wing- or tail-feathers nor wing-coverts.

FIRST SUMMER.—A body-moult takes place as in adult, after which bird is much like adult summer, except for *primaries*, which still have brown shafts and some brown mottling at tips, though this mostly wears off *wing-coverts* and *tail-feathers*.

MEASUREMENTS AND STRUCTURE.—♂ wing 200–230 mm., tail 70–80, tarsus 55–65, bill from feathers 60–70 (12 measured). ♀ wing 200–225, bill 60–67. Primaries (1st vestigial one not included) : 2nd longest, 3rd usually as long but sometimes 5 mm. shorter, 1st usually 5 mm. shorter but sometimes as long, 4th 2–7 shorter, 5th 10–15 shorter, 6th 18–28 shorter ; 2nd to 4th slightly emarginated outer webs. Middle toe with claw 60–70 mm. Rest of structure as in Common Heron.

SOFT PARTS.—Bill, upper mandible blackish-horn, basal half of cutting edge yellowish-green, lower mandible yellowish-green with cutting edge at tip blackish-horn ; bare loral region yellow-green ; legs and feet yellow-green ; iris lemon-yellow. *H.F.W.*

**Characters.**—No subspecies. Dark upper-parts and striped crown and crest, shorter wing and tarsus and longer bill distinguish it from Buff-backed Heron. *H.F.W.*

## Genus **NYCTICORAX** Forst.

NYCTICORAX Forster, Synopt. Cat. Brit. B., p. 59 (1817—Monotype : *N. infaustus*=*nycticorax*).

Bill not longer than head, bulky, strong and broad, upper mandible curved, lower straight, as long as tarsus or shorter. Tarsus in front reticulated. Only small portion of tibia bare. Neck short and thick, head crested and with several long white tape-like feathers. Habits crepuscular. Number of tropical forms, one Palæarctic.

*PLATE 75.*

## 295. THE NIGHT-HERON—Nycticorax nycticorax nycticorax (L.)

ARDEA NYCTICORAX Linnæus, Syst. Nat., ed. x, i, p. 142 (1758—S. Europe).
*Nycticorax griseus* (Linnæus), Yarrell, iv, p. 195 ; Saunders, p. 379.
*Nycticorax nycticorax nycticorax* (L.), Pract. Handb., ii, p. 212.

**Habitat.**—Frequents wooded or bushy swamps and river-banks or neighbourhood of other fresh waters or marshes where there are trees or other suitable cover, in which it remains inactive by day, but at dusk spreads out over almost any sort of open marsh or watersides that may be available. Not averse to frequented places where not disturbed and often breeds in gardens or villages in the east. *B.W.T.*

**Field-characters and General Habits.**—Owing to mainly crepuscular habits is liable to escape notice by day, except at breeding places, unless accidentally flushed from cover. In flight *a short-bodied, compact-looking bird with closely retracted head appearing to merge directly into rather stout body, so that black* *of crown and mantle form continuous area, contrasted with grey of broad, rounded wings and tail.* At rest also appears compact and thick-set, with relatively short legs and with short stout neck appearing to merge directly into body; black regions with blue-green gloss, under-parts greyish-white; three long filament-like white feathers on nape. *Young birds dull, dark brown above spotted and streaked with buffish-white, under-parts dull greyish with dark streaks.* Legs of adults are pale yellowish, though often appearing more or less greyish in life from loosened scutes and adherent mud, but in breeding-season legs of some birds (not all) become rose-pink (C. Thiel, K. Lorenz, B.W.T.). Legs of young birds olive-green. Total length *c.* 24 ins.; body *c.* 12 ins.

Mainly crepuscular in habits, roosting in trees and other thick cover by day and flighting at dusk to feeding grounds, but when feeding young also forages regularly by day and may sometimes be seen in the open at other seasons. Feeds in shallow water (10–15 cm.), swampy borders of reed-beds and along canals and ditches (Steinfatt). Perches freely in trees and clambers about with much facility amongst both slender twigs and reeds, moving, however, with marked deliberation, as it does also on ground. Young also readily leave nest when disturbed and clamber about branches, assisting themselves with wings and bill (Steinfatt). Beats of short, much rounded wings appear rapid for a heron. *B.W.T.*

**Voice.**—Call a hoarse, not un-raven-like croak, may sometimes be heard by day from bird concealed in cover of trees, and when flighting at dusk they call freely in the air. At breeding colonies an assortment of raucous noises is heard, "kaahk, kaahk," "kwuk," "kwuk–uk," "koouk," etc. O. Steinfatt renders ordinary greeting-note of birds at the nest as "quahck, quahck" or "goovock, goovock," to which a squealing "va-va-va-va-va" is often added. Nestlings have ticking note much like young Common Herons. *B.W.T.*

**Display and Posturing.**—Social and sexual behaviour have been extensively studied in present race by K. Lorenz (see, especially, *Proc. VIII Internat. Ornithol. Congress*, Oxford, pp. 207–218) and in American form (*N. n. hoactli*) by G. K. Noble, M. Wurm and A. Schmidt (*Auk*, 1938, pp. 7–40), but the accounts differ in some points. Nest-site is chosen by male, which begins to build and call for mate. "With head and wings lowered, he executes a queer sort of dance - - -, treading from one foot to the other with a peculiar weaving action. From time to time he suddenly lowers his head and neck vertically, while his shoulders lift as if in a hiccough, and he utters his courting cry" (Lorenz). Intensity of this behaviour is increased by approach of another bird of either sex, but when a female arrives she approaches gradually and with great circumspection, the first approach to really close quarters being accompanied by greeting ceremony in which all feathers of neck and head are erected to the utmost extent, the three white plumes standing out at nearly right angles to one another. Beak is then lowered and head and neck stretched far forward towards bird being greeted. According to Lorenz sole function of this erection of plumes is as an "appeasing ceremony" inhibiting the hostile repelling reaction (quick stab with open bill) otherwise natural to any Night-Heron approached by another. Greeted bird responds in same way, and same ceremony, initiated by approaching bird, persists throughout breeding-season whenever one arrives at nest.

Observations of Noble, Wurm and Schmidt indicate a more complex behaviour, at least in American bird. They show that long head plumes are used in a definite sexual or courtship display and deny that in the American form they are erected under any other conditions or have any function in "territory defence or in pacifying approaching individuals." Explanation of their results requires reference to behaviour of immature birds, which occupy and defend definite "territories" in branches after fledging, the family groups tending to break up into pairs, not necessarily of opposite sex, in which one bird (normally male in heterosexual pairs) always dominates the other. Subordinate bird frequently performs gesture called by the authors the "overture," in which head is lowered and weaved back and forth, bill being directed toward side or feet of dominant bird and clicked, while latter usually holds head high, but may occasionally lower it to same position as its companion's. Variants are opening and closing of bills while in contact (billing), dominant bird always holding head higher than partner, actual grasping of latter bird by former with bill, and stroking of breast-feathers with bill. Movements, although started by subordinate bird, induce similar movements by the other. At beginning of breeding-season male attracts female by (1) twig ceremony, and (2) snap-hiss ceremony. In (1) he holds stick in bill and loudly snaps bill on it, while head is moved rhythmically up and down; frequently neck is stretched vertically upward to nearly full extent and bill brought close to neck while snapping continues. Twig may be built into nest, but is more often dropped. In (2), characteristic of male before securing mate, he takes two or three steps forward on nest-platform or on branches, halts, arches back, lowers bill until head is nearly as low as feet, and, while raising one foot, produces click or snapping sound in throat immediately followed by prolonged hiss. When female arrives physiological state (presumably) of male causes him to assume subordinate rôle and he "overtures" exactly like juvenile except that head is often turned until one cheek is parallel with ground; at same time guttural greeting call is uttered. This is followed by a quite distinct display, in which male raises his head, erecting crown-feathers and plumes, raising back-feathers and puffing up those of neck, and bows to female; at same time pupil contracts and eyeball protrudes slightly, exposing red iris to maximum, and bill frequently gapes. Female responds in similar manner, including overture, and in this performance male re-establishes himself as dominant partner, holding head higher than female. Response of female shows that she is stimulated, and authors consider that this mutual display has same effect as in many other birds of raising female's emotional level to requisite condition for successful coition, although this is not immediately preceded by any posturing; female merely stoops while male steps forward on to her back and with shuffling movements of his feet secures grip on her humeri or shoulders.

Allowing for differences of interpretation, conclusion that a real difference exists in behaviour of the two races seems irresistible, yet it appears unlikely that divergence can be as great as the descriptions suggest, and further study, especially of European form, is desirable. Lorenz describes a bill-nibbling of paired birds, accompanied by chattering of mandibles, which is obviously the same as one phase of the "overture" of the American authors, but he regards it as primarily a "reconciliation ceremony" after bill-sparring arising from "misunderstandings" like those described by Verwey in Common Heron. *F.C.R.J. & B.W.T.*

**Breeding.**—Nests in colonies, sometimes in great numbers, together with other species (Little Egret, Buff-backed and Squacco Herons, Glossy Ibis, Pigmy Cormorant, etc.), nests being crowded together on tamarisk bushes or big cork-oaks in Spain, in woods or thickets of alders, sallows, etc., growing in water: also among willows or poplars and occasionally among reeds, in Egypt in high trees. *Nest.*—Materials vary according to site, generally slight and rather flat, with strong tendency to arrange twigs and bits of reed to radiate from centre. *Eggs.*—3 or 4, occasionally 5, light blue-green, unmarked, averaging slightly deeper than Little Egret's but very similar. Average of 100 eggs (12 by E. Rey), 49·52×35·3. Max.: 56·5×34·7 and 51×38. Min.: 43·7×35 and 48·7×31 mm. *Breeding-season.*—Begins last week or two April, but often not till May, while eggs may be found in June. *Incubation.*—Eggs laid at about 48 hours interval: incubation begins with first egg normally. Period, 21 days (Wunderlich): by both sexes in turn. *Fledging.*—Young fed by both sexes: picked up for the first 2–3 days, then young seize parent's bill and pull it down to induce regurgitation. Period: young leave nest at 3–4 weeks but do not fly till about 6 weeks old (O. Steinfatt). Evidence of second brood in some cases definite. (*Cf.* O. Steinfatt, *Beitr. z. Fortpl. Biol. d. Vögel*, 1934, pp. 85–96.) *F.C.R.J.*

**Food.**—Entirely animal: about two-thirds consisting of small fish (small carp (*Cyprinus*), tench (*Tinca*), *Cobitis*, *Carassius*, *Leuciscus*, *Eupomotis*, small eels (*Anguilla*), etc.), newts, lizards, frogs, salamander, water-snake (*Tropidonotus*), Mollusca (water-snails), worms and leeches, aquatic insects and larvæ including Orthoptera (*Gryllotalpa*), Odonata and larvæ, Hemiptera (*Notonectidæ*) and Coleoptera (*Harpalus*, *Pterostichus*, *Dytiscidæ*, *Hydrophilus piceus*). Also small Crustacea (*Apos*) and Arachnida: occasionally small mammals (field-mice) and some vegetable matter. *F.C.R.J.*

**Distribution.**—*British Isles.*—Vagrant. *England.*—Many S. and E. coasts, especially Cornwall, Devon, Sussex, Kent, Norfolk and Suffolk and as far north as Yorks, a good many inland, but few W. and N. In every month, but most in May and June and a good many Oct. and Nov. *Wales.*—Rarely recorded (Glamorgan, Carmarthen, Pembroke, Anglesey). *Scotland.*—Six in south, one Aberdeen, two or three Argyll, one O. Hebrides. *Ireland.*—Twenty-six, of which only one is from Connaught. *H.F.W.*

**Distribution Abroad.**—Holarctic, Ethiopian, Oriental and Neotropical regions. Typical race breeds in Europe in S. Iberian peninsula, central and S. France, Holland, Germany (very rare), Austria, Czecho-Slovakia, Hungary, Yugo-Slavia, Romania, Bulgaria, Albania, N. Italy, Sicily and Russia (Kiev, Kursk, Chernigov, Voronezh, east to Astrakhan, south to Caucasus and Crimea). Also in Asia Minor, Persia, Transcaspia, Amu-Darya, Turkestan, Afghanistan, Baluchistan, Iraq, India, E. Asia to Japan and Sunda Is. and Philippines: in Africa from Marocco to Tunisia and Egypt: also in tropical and S. Africa. Replaced by allied races in N. and S. America, south to the Argentine, also in Sandwich Is. Northern birds migrate and occur in N. France, Belgium, Switzerland, Poland and Mediterranean region. Accidental in Greenland, Færoes, Norway, Sweden, Denmark, Finland, Baltic states, N. W. Russia, Azores, Madeira and Canaries. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—(*Upper-parts*) narrow line on fore-head, above lores and eyes white; whole crown, mantle and upper scapulars black glossed dark green, feathers of crown and mantle (and upper-breast) long and of rather loose structure, rami at tips being separated, bases of feathers brownish-grey; on nape three very long (♂ 130–205, ♀ 130–170 mm.) extremely narrow and pointed white feathers of very close structure, rami being long but lying close to shaft; ear-coverts, sides and back of neck, back and upper tail-coverts and *wing-coverts* ash-grey; (*under-parts*) sides of throat, sides of breast, flanks, axillaries and under wing-coverts very pale ash-grey, sometimes almost pure white; chin, middle of throat and rest of under-parts white; *tail-* and *wing-feathers* rather darker grey than wing-coverts. This plumage is acquired by complete moult Aug.-Nov. SUMMER.—Another complete moult takes place Jan.-March or April (occasionally not quite finished May) after which plumage is like that of winter but black is glossed dark blue rather than green.

NESTLING.—Down of whole crown pale buff-brown at base with long white bristle-like tips without rami, giving conspicuous crested appearance. Rest of down sparse with long silky tips, upper-parts pale buffish-brown with paler buffish tips, under-parts creamy-white. Lores, round eyes, chin, centre of throat, base of back of neck, middle and sides of belly bare. This down is entirely replaced by feathers of juvenile plumage.

JUVENILE.—(*Upper-parts*) crown black-brown, finely streaked buffish-white, each feather having fine shaft-streak; neck and mantle same but with wider and buffer streaks; scapulars with wide buffish-white V-shaped tips; back and rump pale brown, feathers with white central streaks; upper tail-coverts brown with buffish-white shaft-streaks and tips; (*under-parts*) cheeks, sides of neck, sides of breast, flanks, axillaries and under wing-coverts brown to black-brown, feathers with wide pale buff to white central streaks; chin and centre of throat white with few brown marks; centre of breast and belly white, feathers with narrow and somewhat irregular brown edgings; vent and under tail-coverts white; *tail-feathers* grey-brown narrowly tipped buffish-white; *wing-feathers* and *primary-coverts* dark brown tipped white; *greater* and *median coverts* same but tips longer and more wedge-shaped; *lesser coverts* with smaller and darker buff tips.

FIRST WINTER.—(*Upper-parts*) crown and neck much like juvenile but streaks more rufous-buff, not so pale and conspicuous; mantle and scapulars dark brown with an oil-green tinge and slight edgings of rufous (feathers with slightly separated tips); back and rump brown-grey, upper tail-coverts same but with greyish-white tips; (*under-parts*) breast and centre of belly white, feathers with buffish or brownish edgings, sides and flanks pale grey-brown, feathers with buff tips and centres; usually some new *innermost secondaries* and *greater coverts* grey-brown. The juvenile body-plumage is moulted Aug.-Dec., but some feathers often remain unmoulted until spring, except for a few innermost secondaries and greater coverts, wing-feathers and coverts are not moulted nor tail.

FIRST SUMMER.—A complete moult takes place Feb.-April, after which bird becomes much like adult winter, but crown, mantle and scapulars are glossed duller green, grey of rest of plumage is considerably tinged brown, *innermost secondaries* have dark greenish tinge, *inner lesser wing-coverts* brown with small buff tips, long white crest-plumes shorter than is usual in adults. After next autumn moult apparently becomes like adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 265–300 mm., tail 95–110, tarsus 65–75, bill from feathers 65–80 (12 measured). ♀ wing 270–285, bill 66–75. Primaries (1st vestigial one not included): 2nd and 3rd longest, 4th sometimes as long but usually 2–5 mm. shorter, 1st 2–10 shorter, 5th 15–20 shorter, 6th 25–30 shorter, 7th 40–50 shorter; 2nd to 4th emarginated outer and 1st and 2nd inner webs. Bill comparatively short, deep and compressed, distal third of upper mandible curved and tapering to rather blunt point with notch on cutting edge, lower mandible slightly shorter and with finer point. Middle toe with claw 74–83 mm. Rest of structure as in Common Heron.

SOFT PARTS.—Bill green-black, line along cutting edge of upper and of lower mandible green-grey; lores and round eyes bluish; legs and feet pale yellow with faint greyish tinge in front, some rose-pink in breeding-season (B.W.T.), (juvenile green-grey); iris crimson (juvenile brown). *H.F.W.*

**Characters and allied forms.**—Stout bill and general black and grey colouring and long white crest-plumes of adult, and brown streaked and spotted with buff of juvenile distinguish species. *N. n. hoactli* (N. America to northern S. America) and *N. n. cyanocephalus* (southern S. America) are separated. *H.F.W.*

## Genus IXOBRYCHUS Billb.

IXOBRYCHUS Billberg, Syn. Faun. Scandin., i, 2, p. 166 (1828—Type by subsequent determination, of Stone, 1907, *I. minutus*).

Smallest Palæarctic heron, body scarcely as large as Turtle-Dove. Bill very much pointed, both mandibles finely serrated before tip. Culmen nearly quite straight, nostrils slit-like, but short. Long neck bare at back, though concealed by long neck-feathers. Tarsus in front scutate, scutes towards toes sometimes divided into small scales. Differs from former genera and agrees with *Botaurus* in having only 10 tail-feathers, *Ardea*, etc., having 12. No ornamental "train." Sexes differently coloured. Chiefly crepuscular. About a dozen species, but only one in Europe.

*PLATE 75.*

## 296. THE LITTLE BITTERN—Ixobrychus minutus minutus (L.)

ARDEA MINUTA Linnæus, Syst. Nat., ed. xii, i, p. 240 (1766—Helvetia, Aleppo. Restricted typical locality: Switzerland).
*Ardetta minuta* (Linnæus), Yarrell, iv, p. 200; Saunders, p. 381.
*Ixobrychus minutus minutus* (L.), Pract. Handb., ii, p. 215.

**Habitat.**—Haunts reed-fringed meres, ponds and rivers or canals, as well as more extensive reed-beds, especially where willows are mixed with reeds, and is not at all averse to neighbourhood of habitations and comparatively frequented places, even breeding locally by ponds in town parks where bordered by suitable vegetation. *B.W.T.*

**Field-characters and General Habits.**—Though naturally secretive and skulking, spending much of its time in cover of reeds and often difficult to flush, may be seen fairly often on the wing at breeding places, when *pattern of male, whitish wing-coverts forming sharply defined rounded area contrasted with black of rest of wing and back*, is very distinctive. That of female, in which both light and dark parts are much browner, is a good deal less striking. At rest with neck retracted has a "Humpty Dumpty-like" outline with head and body all one, but when on the alert or clambering about in reeds or branches neck is more extended, though still thick, and when assuming protective, "stick-like" attitude it stretches it straight upwards to a startling length. At rest male appears a light buff-coloured bird with black back and crown. Female has back brown, with light edgings to feathers giving somewhat streaked appearance and under-parts are more streaked than in male. Young birds have a mottled and streaked appearance. Total length *c.* 14 ins.; body *c.* 6½ ins.

Flies with fairly rapid wing-beats, usually low over water and reed-beds. Rises with some effort, legs dangling and neck extended, but once under way flies easily and lightly, neck withdrawn and legs extended in usual heron manner. Often glides considerable distance preparatory to pitching. Stated to walk with ease in crouching, rail-like manner, but in general it avoids traversing open ground, keeping amongst reeds and willows, in which it climbs about rapidly and with utmost facility. Sometimes roosts in trees (H.F.W.) and has been found resting in tree-tops on passage; on such occasions rises high before flying off (R. Meinertzhagen), but this is quite unlike behaviour in normal haunts. Has habit of crouching on tarsi with head held below level of shoulders and bill horizontal (G. R. Mountfort), and peculiar flicking movement of tail, which is depressed and then moved in curve sideways and upwards, this being often followed by similar movement to opposite side, so that tail describes figure-of-eight. Though active to some extent by day is distinctly crepuscular, becoming more lively towards evening and in some localities flighting at dusk to favourite feeding places. Not in general gregarious, though parties may be met with on passage and in favoured localities a number may breed fairly close together. *B.W.T.*

**Voice.**—A call-note in flight is a low-toned " quer," short and sudden, which is sometimes prefaced by a higher-pitched and also short " quee " (H.F.W.). Note when excited or alarmed is rendered " gāt," " găck," " yick," etc.; also " aark." A note like " kō " when flushed (G. G. ten Kate) and a loud " gōōgōō " (male) and " yiip-yiip " or " yĭrrp-yĭrrp " (female) at nest-relief (O. Steinfatt) are also recorded. Spring note of male is a rather low, croaking " hōgh " repeated, often for long stretches, with remarkable regularity at rate of approximately 25 to the minute (A. Voigt, B.W.T.) and having peculiar quality of not sounding markedly louder when observer is close to the bird than when some way off. Young greet parents with soft, whispered twittering " tū-tū, tū-tū, tū-tū " and when being fed have harsh cry similar to that of young Crows (G. R. Mountfort). *B.W.T.*

**Display and Posturing.**—Protective attitude with neck and bill extended nearly vertically upward is similar to Bittern's. Remains motionless in this position and has even been known to allow itself to be captured with hand. Young a few days old assume this posture. No display is recorded. Greeting at nest consists of raising and lowering crown-feathers and opening and shutting of bill, and nest-relief is not accompanied by any well-defined ceremonial behaviour (O. Steinfatt, F. Groebbels), though Groebbels once saw a pair cross beaks and touch one another's backs. Coition on nest (R. Zimmermann). Defensive attitude recalls Bittern's, with wings spread and body tilted towards enemy so that one wing is inclined upwards and the other downwards, while neck is half withdrawn ready for stab with closed bill if intruder comes too near (F. v. Lucanus). Has also been recorded " lying flat on the water in a shapeless lump," apparently to escape hawk (R. B. Lodge). *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds in reed-beds, wooded swamps and banks of rivers and lakes. *Nest.*—Sometimes on the floating mat of roots in a reed-bed or among growing or dead reed-stems: also in heaps of dead sedge and among branches of willows and other trees growing in water, usually only a foot or two above water-level, but occasionally in trees at a considerable height (10–12 ft.). Built of reed, sedge, etc., and slight in construction, sometimes with a few twigs or stems of plants, lined with finer materials. *Eggs.*—Usually 5 or 6, but sometimes only 4, while 7, 8, and even 9 and 10 have been recorded, but 10 and 12 may be due to more than one female: rather blunt ovate as a rule, white, with chalky surface and little or no gloss, but sometimes stained with blood. Average size of 100 eggs (29 by E. Rey), 34·87×25·91. Max.: 38·5×26·6 and 34×27·6. Min.: 31·1×23·8 and 33×23·5 mm. Average weight, 674 mg. (640 to 720 mg., E. Rey). *Breeding-season.*—In S. Spain from early May, but in middle Europe about end of May and early June onward: exceptionally in mid-May. *Incubation.*—Normally eggs laid at 1–2 days interval, but observations needed; occasionally much longer intervals recorded (G. R. Mountfort): begins in most cases with 1st or 2nd egg, but not invariably: by both sexes (R. S. P. Bates, A. Burdet). Period: estimates vary from 16 to 19 days. *Fledging.*—Fed by both parents: bill being pulled down by young and regurgitated food passed directly into bills of young, while bits of food in nest are picked up by adults. Period in nest only 7 to 9 days, but young are able to fly at about 30 days old (F. v. Lucanus). Some evidence of second brood at times (R. Zimmermann). *F.C.R.J.*

**Food.**—Vasvári has shown from examination of 53 stomach contents that fish form only about 25·5% of food, which consists chiefly of insects. Records include small mammal (1), frogs, lizard (*Lacerta agilis*), newts, fish (*Esox, Alburnus, Leuciscus, Cyprinus, Perca*, etc.). Insects: Orthoptera (*Gryllotalpa*), Odonata (*Æshna, Libellula* and larvæ), Hemiptera (*Naucoris, Notonecta, Ranatra*), Coleoptera (*Pterostichus, Dytiscus, Cybister, Rhantus, Haliplus, Coccinella, Elater, Chrysomela, Donacia, Onthophagus, Chlorophanus*). Also fresh-water Mollusca, Crustacea (*Astacus*) and spiders. Said to take young of Reed-Warblers in Germany (H. Hocke). *F.C.R.J.*

**Distribution.**—*British Isles.*—Vagrant, chiefly April to June and Aug. to Oct., occasionally other months, rarely winter. *England and Wales.*—Recorded nearly every county, most frequently S. and E. coast counties to Yorks, rare inland and N. and W. Probably bred Norfolk and almost certainly Suffolk within last sixty years. *Scotland.*—Rare, but has occurred as far north as Orkneys and Shetland, though not O. Hebrides. *Ireland.*—Nearly forty, chiefly S. and E. and only one Connaught. *H.F.W.*

**Distribution Abroad.**—Palæarctic, Ethiopian and Australasian regions. Typical race breeds in Europe from Iberian peninsula, France, Belgium, Holland, possibly Denmark, Germany, Baltic states, Poland, Hungary, Romania and Russia (north to Novgorod, Yaroslav, Kostroma, S. Viatka and S. Perm Govts., and south to Caucasus and Crimea). In south to Mediterranean in west and to N. Albania and Macedonia in Balkan peninsula. Also in Africa from Marocco to Tunisia and Egypt and in Asia, Palestine, Syria, Asia Minor, Iraq, Persia, Transcaspia, Kirghiz Steppes, S.W. Siberia, Turkestan, Afghanistan and N.W. India. Replaced by allied races in tropical and S. Africa (*I. m. payesii*), Madagascar (*I. m. podiceps*), and also in Australia and New Zealand. Typical race winters in Africa south to the Cape: and to some extent in S. Asia. Has occurred casually in Iceland, Færoes, Norway, Sweden, Finland, N.W. Russia, Azores, Canaries, Madeira, etc. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) whole crown, nape, mantle, scapulars, back, rump and upper tail-coverts black glossed green (feathers of crown and neck rather long and tips of loose structure); (*sides of head*) line over eye, ear-coverts and feathers on sides of neck covering bare back of neck buffish-grey; (*under-parts*) sides of chin white or whitish, down centre of chin, throat and centre of breast buff, bases of feathers white (feathers of lower-throat elongated); on each side of upper-breast patch of black-brown, feathers margined buff; flanks and sides buff, feathers with some fine brown shaft-streaks; centre of belly, under tail-coverts pale buff to white tinged buff; axillaries and under wing-coverts white, usually tinged buff; *tail-feathers* and *innermost secondaries* black glossed green, and rest of *wing-feathers* and *primary-coverts* black, glossed green on outer webs (1st functional primary very narrowly edged buff to whitish); *innermost wing-coverts* black glossed green, forming a line down inner edge of wing, rest of *greater coverts* white tinged buffish-grey and of *median* and *lesser* pale buff to deeper buff with a small brownish patch on outer *lesser coverts* at *point of wing*. This plumage is acquired by complete moult commencing June.

ADULT FEMALE.—(*Upper-parts*) crown and nape as male but not so glossy and margined by very narrow line of rufous; feathers of sides of neck covering back of neck brown-buff with chestnut tips; mantle and scapulars dark chocolate-brown to reddish-chocolate, feathers margined pale buff giving somewhat streaked appearance; back and rump more uniform dark chocolate; upper tail-coverts black; *under-parts* much as male but more streaked, chin and throat showing more white with long brown-buff stripes and some brown shaft-streaks, flanks and sides of breast with much wider and more numerous dark brown streaks; *tail-feathers* as male but not so glossy; *wing-feathers* more brown-black and *innermost secondaries* and *wing-coverts* chocolate-brown, rest of *wing-coverts* darker and browner-buff than in male and brown patch on *point of wing* more prominent and usually dark reddish-chocolate.

NESTLING.—Down rather short with silky tips, covering bird rather more closely than in Bittern, but lores, round eyes and back of neck bare, upper-parts and sides warm reddish-buff, chin, down centre of throat and breast and belly whitish.

JUVENILE. MALE AND FEMALE.—Much like adult female but (*upper-parts*) feathers of crown duller and edged and tipped rufous; feathers covering back of neck more chestnut with narrow buff tips; mantle and scapulars more broadly edged and also tipped buff; back, rump and upper tail-coverts also tipped buff; (*under-parts*) ear-coverts, centre of chin and whole throat strongly streaked dark buff and brown; *tail-feathers, wing-feathers* and *primary-coverts* very narrowly tipped pale brown; *greater coverts* buff faintly mottled brown and with more or less brown on inner webs (especially on inner feathers); *median* and *lesser wing-coverts* dark brown broadly edged and tipped buff.

FIRST WINTER. MALE.—Like adult but sides of head and neck not so grey, *under-parts* usually darker and more streaked, *wing-feathers* browner, *wing-coverts* darker and usually with some unmoulted, juvenile outer coverts and one or two rufous-brown innermost secondaries. The juvenile body-plumage and apparently wing-coverts and innermost secondaries are moulted in first autumn, but insufficient moulting material is available. FEMALE.—Like adult but *under-parts* more streaked and *wing-coverts* with brown shaft-streaks.

MEASUREMENTS AND STRUCTURE.—♂ wing 142–155 mm., tail 45–52, tarsus 42–47, bill from feathers 45–52 (12 measured). ♀ wing 137–150 (one 157), bill 45–52. Primaries (1st vestigial one not included): 1st and 2nd longest, 3rd 2–4 mm. shorter, 4th 5–10 shorter, 5th 10–15 shorter, 6th 15–22 shorter, 7th 22–30 shorter. Middle toe with claw 47–52 mm. Rest of structure as in Bittern.

SOFT PARTS.—Bill yellow, tinged green, ridge of upper mandible dark brown (nestling bill pale pink, G. R. Mountfort); lores yellow (base of bill and lores ad. breeding, dull red, Mountfort, B.W.T.); legs and feet grass-green, back of tarsus and soles yellowish; iris brilliant chrome-yellow (nestling, green, Mountfort).

*H.F.W.*

**Characters and allied forms.**—Small size, dark crown and upper-parts and pale wing-coverts distinguish it from other British bitterns and herons. Other forms occur in Africa, Australia and New Zealand. *H.F.W.*

### Genus **BOTAURUS** Steph.

Botaurus Stephens, Shaw's Gen. Zool., xi, 2, p. 592 (1819—Type by subsequent determination, of Gray, 1840, *B. stellaris*).

Plumage very soft and rich, especially on head and sides of neck very long and broad, beautifully streaked and barred with brown, black and yellowish. Bill much shorter than tarsus, pointed, strong at base, laterally compressed, finely serrated before tip. Claws long and very little curved, middle toe with claw much longer than tarsus, which is scutate in front. Ten rectrices. Sexes alike. One species in several subspecies in Old World, two other species in America.

*PLATE 75.*

### 297. THE BITTERN—Botaurus stellaris stellaris (L.)

Ardea stellaris Linnæus, Syst. Nat., ed. x, i, p. 144 (1758—Europe. Restricted typical locality: Sweden).
*Botaurus stellaris* (Linnæus), Yarrell, iv, p. 206; Saunders, p. 383.
*Botaurus stellaris stellaris* (L.), Pract. Handb., ii, p. 218.

**Habitat.**—More or less extensive reed-beds and rank vegetation of swamps and fens or bordering meres, lagoons and sluggish rivers; on Continent sometimes breeds regularly near artificial and comparatively small ponds in cultivated districts, where these occur in groups and have sufficient vegetation of the requisite type around them, and is not averse to neighbourhood of habitations if other conditions are suitable (R. Zimmermann). *B.W.T.*

**Field-characters and General Habits.**—In breeding-season male proclaims presence by *booming note* (see under "Voice"); when seen, long pointed bill proclaims it a member of heron family, while *golden-brown plumage mottled and barred with black* distinguishes it from other European members of the group, whether it is flying with slow, rather owl-like action over tops of reeds, standing with neck retracted or extending it nearly vertically upwards in protective attitude (see under "Posturing"). Crown and nape black, back richly mottled with black, sides of head and neck more uniform brown, underside broadly streaked reddish-brown, that of neck with streaking concentrated in central band; wing-quills barred rich brown and black. Young much like adults, but quills more uniform. Plumage of front of neck very thick and elongated, forming a kind of expansible shield of feathers. In position of rest with neck retracted and bill pointing obliquely upwards contour of neck is hidden by thick feathering, so that it appears short and thick and not clearly defined from body. In flight appearance is similar and legs trail behind in typical heron fashion; wings broad and rounded. Total length *c.* 30 ins.; body *c.* 14 ins.

Though essentially a skulking and secretive bird, keeping for the most part to cover of reeds and swamp vegetation, Bittern may at times be seen standing in the open near water's edge, though nearly always close to cover of reeds; this is especially the case in hard weather and at other times is not as exceptional as often supposed. It may also occasionally be met with fishing in open shallows close to cover or in some reedy ditch, but most of food is obtained from shallow water in cover of reeds. Habits decidedly crepuscular, though it also feeds in the daytime. When feeding young may be seen regularly passing to and fro over reed-beds, but at other times is not often observed on the wing except if flushed, when it usually flies a short distance and drops into cover again. Neck is extended until well on the wing, and when flight is only for quite short distance is sometimes not fully withdrawn at all. Gait is usually deliberate, with shoulders high and head lowered, though it can run if necessary. In cover it often progresses above ground or water-level by grasping reeds, several at a time, with the toes, moving in this manner with astonishing facility for so comparatively large a bird. Only very rarely perches in trees, but Labouchere (quoted by Dresser) states that it will roost in trees before reeds have acquired sufficient height to give good shelter. Usually solitary, though occasionally several may be seen together, especially at migration times. Does not associate with other species. Use of powder-down has been described by Lord W. Percy (*Bull. B.O.C.*, lii, 1932, pp. 136–8, and (with photographs) *Country Life*, June 18, 1932). Principal function of " powder " appears to be removal of slime from head and neck after capture of eels. Head is buried in feathers at sides of breast and rubbed up and down powder-down patches until plumage acquires a floury appearance from the powder, which is left for a time and then brushed off by vigorous scratching. Finally, with tail-coverts raised vertically, and oil-gland fully exposed, elaborate oiling of head and neck takes place : actions well shown in cinematograph film. *B.W.T.*

**Voice.**—Call of both sexes a raucous " aark, aark " or sometimes " awk, awk." Spring note of male is deep resonant boom, not remarkably loud, but of extraordinary carrying power, certainly audible well over a mile and according to E. L. Turner up to as much as 3 miles under favourable conditions. At close quarters two or three preliminary short coughs or grunts are heard, followed by long-drawn inspiration and then the boom. Inspiration and boom commonly repeated 3 times, often 5 or 6 (Turner) and sometimes up to 8 or 9 (T. A. Coward). " During the intake the head is thrust forward horizontally and the whole body vibrates as it gasps, then in order to boom the head and neck are raised, but not quite perpendicularly " (J. Vincent). Booms at all hours of day or night, but most often after sunset and before dawn, commencing in early Feb., but sometimes at end of Jan., and commonly ceasing in mid-June, though heard till as late as July 18 (Turner). Female sometimes answers with soft booming sound, a subdued " wumph " (Turner) and a continuous soft croaking noise to young is also described (H. Boardman). Nestlings have " an incessant quaint cackling " (Coward) and fledged young make a bubbling sound like that of air blown through straw into glass of water (Turner). *B.W.T.*

**Display and Posturing.**—In protective posture neck is extended almost vertically with bill in line, bird remaining perfectly rigid, but always keeping striped under-side of neck, whose pattern blends with that of reed-stems, facing observer. If actually threatened it assumes frightening attitude, in which neck-feathers are spread out to side and those of crest raised, and bill directed towards enemy, while to ward off attack it sinks on ground with wings spread and bill framed in kind of shield of spread crest and neck feathers, ready for lightning stab with half-open bill at enemy's head. See, especially, A. F. J. Portielje, " Zur Ethologie bezw. Psychologie von Botaurus stellaris (L.)," *Ardea*, xv, 1926, pp. 1–15 (with photographs). No definite sexual display has been observed, but E. L. Turner records aerial displays of as many as 4–6 individuals, mostly males, in May and June, birds circling round one another like soaring gulls, sometimes shooting rapidly upwards and planing down. Occasionally one or two females take part, but these are generally breeding at the time and performances evidently have in some sense a communal character, participants in some cases coming from territories as much as 3 miles away. *F.C.R.J. & B.W.T.*

**Breeding.**—Nests in reed-beds on shores of lakes, in marshes or on banks of large rivers. *Nest.*—Among reed-stems of previous year or sedge, as a rule resting on the matted roots and built up above water-level: exceptionally on tussock in open water: not as a rule very far from open water: rather carelessly built of bits of reeds, sedge, *Cladium*, etc., and lined with finer materials. Built by female alone. *Eggs.*—Usually 4 to 5 or 6, but 7 recorded occasionally: also 3 only at times: colour olive-brown, without gloss, sometimes fine brown speckles, chiefly at big end. Shape blunt ovoid. Average of 100 eggs (22 by E. Rey and F. Henrici), 52·62×38·54. Max.: 58·2×37·1 and 54·1×41·5. Min.: 47·5×35·7 and 51·6×35·5 mm. Average weight, 2·7 grams. *Breeding-season.*—Rather variable: usually from early April to late May and exceptionally at end March in England: very similar in middle Europe, but earlier in Mediterranean region. *Incubation.*—Eggs are laid at intervals of 2 to 3 days and incubation begins with first egg and is by female alone. Period: 25 (26) days for each egg, but evidently some variation occurs, and incubation may cease after hatching has begun. *Fledging.*—Young fed by female only, bringing food in crop and regurgitating it into the nest, the bill being seized by the young in turn and pulled down, after the first day or two. After 2 to 3 weeks young begin to leave nest, but are not fully fledged till nearly 8 weeks old (O. Heinroth). Single-brooded, but there is strong evidence that the male sometimes pairs with a second female after the first has begun to brood. *F.C.R.J.*

**Food.**—Varied: British records include small mammals (water-vole, shrew and mouse), birds (young of Bearded Tit; Wren and Water-Rail swallowed whole): fish up to considerable size (eels (*Anguilla*) up to 15 ins.; pike (*Esox*) to 14 ins., dace, roach, trout, grayling, miller's thumb (*Cottus*) three-spined stickleback, etc.): frogs, newts, Crustacea (small crabs and shrimps) and insects (Hemiptera (especially *Notonecta*), Coleoptera (chiefly water-beetles (*Dytiscidæ*), etc.) and Diptera). Also some vegetable matter (water-weeds and grass). Continental records include many other species: lizard, frogs (*Rana esculenta, Bombinator, Pelobates*): among insects, Orthoptera (*Gryllidæ*), Dermaptera (*Forficula*), Odonata (*Æshna, Libellula* and larvæ), Hemiptera (*Naucoris, Nepidæ*), Coleoptera (over 20 families and genera recorded), Mollusca, spiders, etc. (See N. Vasvári, *Aquila*, 1927–28, p. 361.) *F.C.R.J.*

**Distribution.**—*British Isles.*—Breeds regularly Norfolk and Suffolk. Otherwise visitor chiefly in winter but often also in summer. Formerly bred regularly in many places England, Wales, S. Scotland, and Ireland, and in Norfolk as late as 1868, while in 1886 a young one with down still upon it was found there; in 1911 it was proved to have bred again in Norfolk (E. L. Turner, *Brit. B.*, v, pp. 90–97), and has since bred there in gradually increasing numbers and over a wider area; some also breed Suffolk and has bred recently Cambridge. Several reports of regular "booming" in spring indicate possible breeding in other counties, but there is no conclusive proof. To Scotland irregular visitor, but has occurred most parts (mainland and islands), as also in Ireland. A nestling ringed Saxony recovered Cheshire following January; two Norfolk nestlings recovered within short distances of where ringed, 3 months and 8 months later. *H.F.W.*

**Distribution Abroad.**—Palæarctic, Ethiopian, and Australasian regions. Typical race breeds in Europe north to Denmark, 60° in Sweden, S.E. Finland and Russia (W. Archangel, Olonetz, Kostroma and 57° in Urals). In south to S. Spain and Portugal, S. France (Camargue), Italy, Macedonia, Bulgaria, Romania, and in Russia to Black Sea and Caucasus. Also from Marocco to Tunisia in N. Africa: Balearic Is., Sardinia, Palestine, Asia Minor, ? Iraq, Persia, ? Afghanistan and Baluchistan, Transcaspia, Kirghiz Steppes, Turkestan, W. Siberia and east to Manchuria and E. Siberia. Replaced by allied races in S. Africa (*B. s. capensis*) and perhaps also in Australia (*B. s. poiciloptilus*). Partial migrant, through Mediterranean region to tropical Africa, Arabia, N. India, etc. Has occurred in Iceland, Færoes, Norway, Heligoland, Azores, Madeira and Canaries. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) crown black, feathers on back of crown with narrow, and those on nape with wide, tips of yellow-buff, narrowly barred black; neck yellow- to tawny-buff, feathers irregularly barred black (feathers of crown and neck rather long and of loose structure); mantle, scapulars and back much same but with more black, most of centres of feathers as well as thick irregular bars and spots being black, edges and indentations between black bars yellow-buff to tawny-buff; upper tail-coverts yellow-buff irregularly marked brown-black; (*sides of head*) line over eye and ear-coverts yellow-buff sometimes faintly barred brown-black; sides of neck rather more tawny and finely barred black; from gape a moustachial stripe brown-black, feathers tipped tawny-buff with black bars; (*under-parts*) chin and throat pale buff, feathers down centre with long stripes of variegated rufous-brown (feathers of lower-throat much elongated); rest of under-parts pale yellow-buff with broad black stripes which on sides of belly are usually more rufous-brown and on centre of belly and under tail-coverts fewer and fine; buff of flanks and axillaries with rather more rufous tinge and barred dark brown; under wing-coverts lightly and irregularly marked dark brown; *tail-feathers* rufous-buff heavily marked in centre and vermiculated on edges with black; *wing-feathers* pale rufous, tipped, irregularly but broadly barred, spotted and vermiculated with black, inner secondaries with outer edges yellow-buff; *primary-coverts* mostly black with irregular rufous bars; rest of *wing-coverts* much as upper-parts but with rather less black and more buff. This plumage is acquired by complete moult Aug.-Jan.

NESTLING.—Down long with silky tips, rather scanty on upper-parts and very scanty on under-parts; lores, round eyes, back of neck and sides of body bare. Upper-parts varying light chestnut-red to duller reddish-chocolate, chin and throat whitish to whitish-buff, rest of under-parts rufous-buff. Down is entirely composed of pre-pennæ.

JUVENILE.—Very much like adult but *moustachial stripe* less well marked, feathers being usually not black but finely barred rufous and black-brown, rufous-brown stripes on *chin* and *throat* less well marked and those on *breast* browner, not so black, and finer, buff of whole plumage paler especially on *under-parts* and *wing-coverts*.

FIRST WINTER.—Like adult and not to be distinguished with certainty, but *moustachial stripe* not quite so prominent and *wing-coverts* paler. The juvenile body-plumage is moulted July to Jan. but apparently not wing-coverts, wing- or tail-feathers.

MEASUREMENTS AND STRUCTURE.—♂ wing 320–350 mm., tail 95–115, tarsus 90–100, bill from feathers 69–75 (12 measured). ♀ wing 300–350, bill 65–75. Primaries (1st vestigial one not included): 1st, 2nd and 3rd about equal and longest, 4th sometimes as long but usually 2–10 mm. shorter, 5th 10–25 shorter, 6th 25–45 shorter, 7th 40–60 shorter; webs not emarginated but tips of outer feathers attenuated. Tail square, 10 soft feathers, tips rounded. Under tail-coverts about as long as tail-feathers. Back of neck bare of feathers for its whole length but hidden by feathers of sides of neck. Not more than a quarter of tibia bare. Middle toe with claw 108–120 mm. Rest of structure as in Common Heron.

SOFT PARTS.—Bill greenish-yellow, ridge of upper mandible brown at base, black-brown at tip; lores and round eyes green to " livid blue "; legs and feet pale green, yellowish at tarsal joint and back of tarsus, soles yellow; iris yellow. (Nestling, bill, legs and feet blue-green. E. L. Turner.) *H.F.W.*

**Characters and allied forms.**—Size, variegated buff and black plumage and barred wing-feathers distinguish Bittern from other British bitterns and herons. *B. s. capensis* (S. Africa) is considerably darker on upper-parts. *H.F.W.*

*PLATE 75.*

## 298. THE AMERICAN BITTERN—Botaurus lentiginosus (Mont.)

ARDEA LENTIGINOSA Montagu, Orn. Dict., Suppl. (under Freckled Heron), text and plate (1813—Piddletown in Dorsetshire).

*Botaurus lentiginosus* (Montagu), Yarrell, iv, p. 213; Saunders, p. 385; Pract. Handb., ii, p. 221.

**Habitat.**—Closely similar to that of European Bittern, but appears to occur more regularly in comparatively small areas of swamp and frequently visits more or less open meadows and pastures. *B.W.T.*

**Field-characters and General Habits.**—In general appearance resembles European Bittern, but is rather smaller and differs in having *upper-parts finely freckled instead of boldly mottled with black, primaries uniform dark brownish-grey instead of barred and crown brown instead of black.* Total length *c.* 26 ins.; body *c.* 12 ins.

Habits closely resemble those of European bird except that it appears to be seen more often in the open. *B.W.T.*

**Voice.**—Notes, heard chiefly in flight, described as a nasal " haink " and a croaking " ok-ok-ok-ok " (W. Brewster). Spring note of male, preceded by succession of low clicking or gulping sounds accompanied by quick opening and shutting of bill, is deep resonant sound rendered as " pump-er-*lunk* " and repeated 2 or 3 to 6 or 7 times (S. Brewster), delivered with violent convulsive movements, head and neck being thrown upward and then forward (B. Torrey). Sound is described as having two distinct variants, one recalling that made by old-fashioned wooden pump, the other closely resembling that of blows on a stake being driven into ground, but accounts are somewhat contradictory as to whether there are really two forms of utterance or difference is due to distance. For mechanism of booming, see J. P. Chapin, *Auk*, 1922, pp. 196–202. *B.W.T.*

**Display and Posturing.**—Protective attitude, and apparently also defensive postures, same as in European bird. Has striking display in which white plumes in front of shoulders, ordinarily completely concealed, are gradually spread to form two wing-like expansions which meet or nearly meet across back, forming kind of ruff standing up almost vertically or more nearly horizontal. Ruff may be kept expanded as birds follow one another in low crouching attitude with head closely withdrawn and moving with smooth gliding motion quite distinct from normal gait, while standing still, and also while " pumping " (W. Brewster, H. W. Wright, W. G. Fargo). Though described as " courtship " or as " nuptial " it seems clear from Brewster's account that display is aggressive (two birds both displayed and performance ended in a fight) ; whether it is sexual as well is not so clear. Fargo's account might be interpreted either way, but looks very like case of paired male driving off intruding female (*cf.* Mallard, p. 234). Wright's case, in which male displayed and bird presumed to be female occasionally showed up amongst reeds, looks more like sexual display, but question needs further attention. Wright's and Fargo's observations seem late in season for " courtship " (May 21, June 15), but Brewster's was on Apr. 17. Fargo also observed head raised, when " the nearly white feathers on the throat from the base of the lower mandible downward some 3 ins. were raised so that they projected straight out like a brush." *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds in marshes among *Typha latifolia* and *Scirpus lacustris*, nest built up 6 or 7 inches above water-level. Also recorded as nesting in dry marsh among long grass. *Nest.*—Usually composed of dead " cat-tails " and rushes, with occasionally a few twigs and coarse grasses in lining. *Eggs.*—Usually 4–5, but 3, 6 and sometimes 7 recorded : colour much as European eggs, uniform olive-buff : shape blunt ovoid. Average of 73 eggs (43 by A. C. Bent), 49·08×36·76. Max. : 54·5×36·3 and 48×39·2. Min. : 45·5×36 and 48×33·5 mm. *Breeding-season.*—In northern states from May 12 to mid-June : in south from April 21 to June. *Incubation.*—About 28 days (Bent) but no details as to share of sexes : probably by hen. *Fledging.*—Young fed by hen, food regurgitated from crop down the beak, grasped at right angles by one bird at a time and pulled down : young thus fed in succession (I. N. Gabrielson). Period in nest about two weeks. Single-brooded. *F.C.R.J.*

**Food.**—British records include field-vole, smooth newt, fish (perch) and insects (Coleoptera). A. C. Bent summarizes American records : food entirely animal matter, largely frogs or small fish, but also meadow-mice, lizards, small snakes (a garter snake 16 ins. long fed to young), eels, crayfish, Mollusca and insects, including Orthoptera (grasshoppers), Odonata (dragonflies), Coleoptera, etc. *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. Most Oct.–Nov., some Dec. to Feb., one March. *England and Wales.*—Over twenty : Scilly Is. (1), Cornwall (3 or 4), Devon (2), Somerset (1), Dorset (1), Hants (2), Sussex (4), Kent (2), Yorks (2), Lancs (1), Anglesey (1), and Pembroke (2). *Scotland.*—Eight : Dumfries (2), Ayr, Aberdeen, Morayshire, Caithness, Islay (I. Hebrides), Benbecula (O. Hebrides). *Ireland.*—Eighteen : Munster (8), Leinster (5), Ulster (5). *H.F.W.*

**Distribution Abroad.**—Nearctic region. Breeds from British Columbia, Mackenzie, Manitoba, Ungava and Newfoundland, south to California, Arizona, Nevada, Utah, Colorado, Kansas, Ohio and New Jersey, occasionally in southern states. Winters south to Cuba, Guatemala and Panama. Casual in Bahamas, Porto Rico, Jamaica and Bermuda: accidental in Greenland, Iceland, Færoes, Channel Is., Azores and Canaries. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—(*Upper-parts*) whole crown chestnut-brown, centres of feathers black; feathers covering hind-neck olive, edged and slightly freckled yellow-buff, those at base of neck with rufous-brown tips; on sides of upper neck a line or patch of blue-black more pronounced and longer in male than female; mantle and scapulars dark chestnut, brown finely and closely barred and freckled black and varying amount of buff-feathers of upper-mantle broadly edged buff; back, rump and upper tail-coverts as mantle, but still more finely freckled and uniform grey-brown bases of feathers showing a good deal on rump; (*sides of head*) very short moustachial stripe chestnut-brown; cheeks and ear-coverts golden-buff; (*under-parts*) chin white to creamy-white with rufous line down centre; whole throat with broad stripes of rufous finely freckled and with a fine black outline, feathers edged pale buff to whitish (feathers of lower-throat much elongated); breast and belly same but stripes less rufous and not definitely outlined black; on each side of upper-breast above "powder" down a concealed patch of feathers of loose structure white with creamy tips; centre of belly and under tail-coverts almost uniform pale buff; axillaries finely barred and freckled brown; under wing-coverts mostly buff with some brown frecklings; *tail-feathers* dark brown to rufous-brown, edges more or less freckled paler or more rufous-brown; outer five functional *primaries* brown-black with very small buffish tips, rest of primaries and outer *secondaries* same but with tips rufous to buff finely freckled black; innermost *secondaries* like scapulars; *primary-coverts* like inner primaries; *wing-coverts* much as upper-parts but paler and more buff and more finely and closely freckled brown. This plumage is acquired by complete moult July-Nov.

NESTLING.—(Not examined.) A. C. Bent gives down on upper-parts long and fluffy, light buff, tawny-olive or clay-colour, on under-parts more scanty and greyer or more whitish.

JUVENILE.—Like adults but with sides of neck not so olive and without black patches.

FIRST WINTER.—Like adults. The juvenile body-plumage but not wing- or tail-feathers nor wing-coverts is moulted Aug.-Nov.

MEASUREMENTS AND STRUCTURE.—♂ wing 270 (one 250)–305 mm., tail 80–100, tarsus 86–97, bill from feathers 68–80 (one 86) (14 measured). ♀ wing 245–270, bill 68–75. Primaries (1st vestigial one not included): 2nd and 3rd longest, 1st and 4th 5–10 mm. shorter (rarely as long), 5th 15–25 shorter, 6th 25–40 shorter, 7th 40–55 shorter; webs not emarginated, but tips of outer two feathers attenuated. Middle toe with claw 98–104 mm. Rest of structure as Bittern.

SOFT PARTS.—Bill yellowish-green, ridge of upper mandible brown at base, black-brown at tip; lores and round eyes yellowish; legs and feet yellowish-green; iris yellow. *H.F.W.*

**Characters.**—No subspecies. At once distinguished from Bittern by its unbarred wing-feathers, browner crown, black patch on side of neck, less black and buff, browner and finely freckled upper-parts. *H.F.W.*

[NOTE.—A specimen of the GREEN HERON, *Butorides virescens virescens* (L., inhabiting eastern N. America and wintering from West Indies southwards, was shot) in Cornwall, Oct., 1889 (Saunders, p. 386).]

## Sub-order PHŒNICOPTERI.

Flamingos. Nidifugous Ciconiiformes with enormously long and slender legs and remarkable bill, abruptly bent in middle and both mandibles with fine transverse lamellæ as in ducks. 19 cervical vertebræ. A pair of openings or fontanelles in occipital region of skull. Sternum with one incision on either side, stork-like. Tarsus broadly scutate, tibia mostly bare, front toes connected with complete incised webs. Hind-toe very small or absent. Holorhinal, nares pervious, slit-like. Carotids fuse near base to single vessel, with right root much reduced. Cæca well developed, about 3 ins. long. Syrinx tracheo-bronchial. Ambiens feebly developed. Muscle formula BXY. Pectoral muscle two-layered. Pelvis and various other osteological features, various features of musculature, and arrangement of intestine essentially stork-like. Eleven functional primaries, the first being vestigial. Rectrices 12–16. Body-plumage close and hard, with aftershafts. Rich development of down as in Anseriformes ; pterylosis stork-like, neck fully feathered. Wing-quills moulted at same time. Oil-gland generally with four openings on either side. Lower jaw with hooked posterior process as in *Threskiornithidæ*. Cervical air-sacs divided by septa. Great development of air-spaces under skin. A rudimentary copulatory organ. Tongue very thick, fleshy, as in Anseriformes. Lores bare. Eggs two, white, chalky, unspotted. Nestlings with two downy plumages. Three genera in New and Old World

## Family **PHŒNICOPTERIDÆ.**

Sole family of sub-order. Characters those of sub-order.

## Genus **PHŒNICOPTERUS** L.

Phœnicopterus Linnæus, Syst. Nat., ed. x, i, p. 139 (1758—Monotype : *P. ruber*).

Contains only *Ph. ruber* with its subspecies *Ph. ruber roseus* and *chilensis* characterized by broad upper mandible which closes on lamellæ of lower one (in *Phœniconaias* and *Phœnicoparrus* upper mandible is enclosed between rami of lower one), chin bare, and a small hind-toe present.

*PLATE 76.*

### 299. **THE FLAMINGO—Phœnicopterus ruber roseus** Pall.[1]

Phœnicopterus roseus Pallas, Zoogr. Rosso-Asiat., ii, p. 207 (1811—Kirghiz Steppes, S. Russia).
*Phœnicopterus antiquorum* Temminck, Man. d'Orn., 2nd ed. ii, p. 587 (1820—Europe).
*Phœnicopterus roseus* Pallas, Yarrell, iv, p. 244 ; Saunders, p. 395 ; Hand-List, p. 126 (1912).
*Phœnicopterus ruber antiquorum* Temm., Pract. Handb., ii, p. 223.

**Habitat.**—Shallow, open fresh-water, brackish or salt lagoons, lakes, and shallow coastal waters or estuaries. *B.W.T.*

**Field-characters and General Habits.**—*Enormously long legs and neck and peculiar downward deflected bill* make Flamingo unmistakable. At rest appears a rather " washed-out " pinkish-white colour, but spreading of wings brings into view magnificent scarlet of coverts set off by bold contrast with black quills, and spectacle of a large flock taking wing is one of the most splendid an ornithologist can imagine. Appearance in flight is just as unique as on ground, *neck and legs being fully extended*. Immature birds are smaller and have shorter legs and necks than adults and a more or less streaky brownish plumage with whiter under-parts, adult coloration being acquired gradually. Adults also differ decidedly in size. Total length *c.* 50 ins.; body *c.* 21 ins.

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[1] For note on the date of Pallas's work and the consequent change of name see vol. i, p. 199 footnote.

Very gregarious, single birds being rarely seen except in case of stray migrants, and flocks frequently numbering several thousands. When approached they move off in a body ahead of observer and show no undue haste to fly unless approached too close. Flies with moderately rapid wing-beats at a fair speed (faster than Heron), often gliding a short distance before pitching and running several yards after doing so on account of the impetus with which it lands. Frequently takes a short run with flapping wings before getting under way, but W. E. Clarke describes how in a gentle breeze flocks deliberately turned to face into it and rose without effort. Flocks fly in long wavy lines, Vs and irregular formations. Normal gait a sedate walk, though young birds and winged or moulting adults (temporarily flightless from simultaneous loss of quills) are stated to be able to run well. Purely terrestrial, never perching. Spends most of time wading in shallow water, feeding with head partly or wholly immersed and normal position of bill inverted, so that dorsal surface is downwards. Food organisms are strained out through lamellated borders of bill and birds frequently perform a treading movement in order to stir them up from the mud; according to T. de Vries this movement is more often backwards than forwards. Though not ordinarily swimming will do so voluntarily on occasions, and W. T. Blandford even records a flock swimming in sea at least half a mile from shore. A. O. Hume describes swimming bird as carrying neck nearly straight and bent slightly forwards, but this was a winged example pursued by a boat; an escaped (young) bird in England which was frequently seen swimming did so with neck curved over back and head between shoulders, while tibia was held close to body, so that tarsal joint was visible under tail as it paddled along (H. G. Alexander). Resting position is with neck thrown into snake-like curves and head tucked under feathers of shoulders, frequently supported on one leg. *B.W.T.*

**Voice.**—Remarkably goose-like. A goose-like "conversational" babble may be heard from flocks before taking wing and louder notes in flight, of which one like "kawuck" and a more resonant, honking "aahonk, aahonk" appear to be chief forms. Note of very young birds (of American race) is described as a puppy-like barking, which is soon followed by kind of squealing whistle, and this in turn by a chirruping crow, which persists until bird is at least two months old (F. M. Chapman). *B.W.T.*

**Display and Posturing.**—No display has been observed, though W. E. Clarke saw "a little billing of an amatory nature" in flocks in May, and F.C.R.J. has observed wreathing of necks in a swan-like fashion. Coition has been described in captive birds (American form). Male closely follows female, which presently walks in narrow circle with male close on her heels and pressing breast against her back; he then flies on to back of female, which now stands still, and merely balances himself a little with wings during the act (G. Steinbacher). Pointed feathers of back are erected when angry. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds in shallow water in lagoons, edges of lakes or flooded area in Spanish marisma: often in brackish water. *Nest.*—A conical heap of mud scooped up by the birds and raised till a few inches above water-level with a shallow depression in the middle, about 15 ins. across. Apparently built by both sexes. *Eggs.*—Two, white with a soft chalky outer layer, readily stained and scratched, pointed and elongated ovoid in shape. Average of 100 eggs (12 by E. Rey), 88·82×54·58. Max.: 103·5×56·5 and 93·7×60·1. Min.: 77×48·4 and 94·5×47·7 mm. Average weight 17·77 grams (15·9 to 19·5 gr., Rey). *Breeding-season.*—About last week in May as a rule in Spain. *Incubation.*—Said to be by female alone, but in confinement both sexes of American form took part (G. Steinbacher). Period said to be 30–32 days, but no reliable data available on this point or on *Fledging*. Single-brooded. *F.C.R.J.*

**Food.**—Food largely obtained from brackish or saline lagoons but not entirely. Both animal and vegetable matter recorded: grasses and water plants growing beneath surface torn up (A. Chapman): only vegetable matter in stomach (O. Salvin): seeds of *Medicago lupulini* and a sedge (*Cyperus*) in gullet (C. B. Ticehurst). Animal matter includes: fish (small mullet fry): Mollusca (*Cardium edule*, *Paludestrina acuta*, *Cerithium*, *Neritina*, *Syndosmya*, *Venus*, *Mytilus*, *Tapes*, etc.): Crustacea (*Artemia salina* (W. E. Clarke) and *Sphæroma marginatum*); also insects (larvæ of *Chironomus* in Tunisia). *F.C.R.J.*

**Distribution.**—*England and Wales.*—Very rare vagrant. Obtained some fifteen times and seen on a good many occasions. *Scotland and Ireland.*—One shot R. Ythan, Aberdeen, July 15, 1931. One observed Londonderry April, one Cork May-June and one O. Hebrides June-Sept., 1938. Some recorded occurrences were certainly escaped birds, and most recorded in recent years are open to that suspicion although often in perfect plumage and very wild. *H.F.W.*

**Distribution Abroad.**—S. Holarctic, Ethiopian, Oriental and Neotropical regions. The Old World form breeds very locally in Mediterranean region, Cape Verde Is., S. Spain, S. France (Camargue, occasionally), Tunisia (occasionally), formerly lower Egypt, Transcaucasia, N.W. Persia, Caspian Sea, Aralo-Caspian region, Kirghiz Steppes, S.W. Siberia, Persian Gulf, Rann of Cutch and possibly elsewhere in Asia and Africa. Occurs in Canaries, N.W. Africa, and Mediterranean: also tropical Africa, S. W. Asia east to Lake Baikal, and India and Ceylon. As vagrant north to Norway, Gotland, Finland and Kazan Govt. in Russia. Replaced by allied races in America: by *Ph. r. ruber* on Atlantic coasts of tropical and subtropical America and by *Ph. r. chilensis* on Pacific coast of temperate S. America. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—Whole *body-plumage* white with more or less pink tinge, stronger when newly moulted than when worn but varying individually; lower scapulars pale pink; axillaries and under wing-coverts rose-pink usually bright, lowest series of under wing-coverts black; *tail-feathers* pale pink but inner webs often white; *primaries* and *secondaries* black but innermost secondaries as *primary-coverts* rose-pink; rest of *wing-coverts* bright rose-pink varying somewhat in intensity. This plumage is acquired by complete moult July-Nov. or Dec.[1] SUMMER.—A moult involving body-feathers and occasionally some inner greater and median wing-coverts, but not rest of wing-coverts, nor wing- or tail-feathers, takes place Jan.-May. Coloration as winter.

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[1] It has been frequently stated that the wing-feathers are shed together as in geese and ducks, and Dr. O. Heinroth says the birds are incapable of flight for several weeks. Unfortunately no specimen in this stage of moult has been available for examination, but some specimens indicate that the wing-coverts are moulted normally and apparently some of the inner wing-feathers and possibly not all the feathers of the wing are dropped together. *H.F.W.*

NESTLING.—Down white, tinged pale grey on upper-parts, short, rather "woolly" and closely covering whole bird but loral region bare. This down is entirely replaced not by feathers but by a darker grey down which appears to be under-down of juvenile plumage. Bill not bent but tip flattened and depressed.

JUVENILE.—(*Upper-parts*) head and neck grey-brown, feathers tipped white giving a somewhat speckled appearance; mantle and scapulars brown, feathers edged white and shafts dark brown; back and rump white, feathers with dark brown shafts widening to wedge-shaped tips; upper tail-coverts white; *under-parts* white, varying number of feathers especially on sides and flanks with fine brown shaft-streaks; axillaries rose-pink varying in depth, tips of shafts brown and tips of feathers edged brown; under wing-coverts white to rose-pink with brown shafts and often brown wedge-shaped tips, lowest series brown edged hoary; *tail-feathers* white, sometimes edged brown and sometimes tinged pink; *wing-feathers* black-brown, inner webs edged brownish-white and of inner secondaries edged white; *primary-coverts* white to pale pink with long brown tips and brown shafts; *greater coverts* white (outer ones sometimes tinged pink) with dark brown shafts and tips; *median* brown with dark brown shaft-streaks and white bases, but amount of white varies and sometimes brown is confined to tips of feathers; *lesser* as median but paler and less brown (often confined to median streak) and often tinged pink.

FIRST WINTER AND SUMMER.—New body-plumage white, otherwise as juvenile. The juvenile body-plumage is moulted Sept.-March but not wing-coverts, wing- or tail-feathers and frequently only part of body-plumage.

SECOND WINTER AND SUMMER.—Like adult but *body-plumage* without pink, *wing-coverts* paler pink and many lesser coverts with fine brown shaft-streaks, usually also upper series of under wing-coverts and axillaries tipped brown or with tips of shafts brown, tips of primary-coverts brown and inner webs of inner secondaries white.

THIRD WINTER AND SUMMER.—Some birds like adults but with *primary-coverts* white tipped brown, white edgings to inner webs of *inner secondaries* and occasionally with a few fine brown shaft-streaks on *lesser wing-coverts* may be third-winter birds.

MEASUREMENTS AND STRUCTURE.—♂ wing 36–44·5 cm., tail 125–157 mm., tarsus 24–36·5 cm., bill from feathers 120–135 mm. (12 measured). ♀ wing 35·5–42·5 cm. Primaries (1st vestigial one not included): 1st and 2nd longest, 3rd as long or 10 mm. shorter, 4th 25–40 shorter, 5th 50–65 shorter, 6th 75–90 shorter; 2nd and 3rd emarginated outer and 1st and 2nd inner webs. Tail doubly emarginated, central and outer feathers being slightly longer than rest, 14 feathers, tips rounded. Under tail-coverts about as long as tail. Bill bent in middle and decurved, upper mandible distal to bend flat, broad, very shallow, with nail-like tip, lower mandible deeper, much grooved at tip, cutting edges with lamellæ fine and close on lower, more tooth-like and separated on upper mandible. Nostrils slit-like. Skin of loral region and round eyes bare. Neck very long and slender. About three-fourths of tibia bare. Toes webbed for about two-thirds their length, claws flat, rounded, nail-like, hind-toe very small, elevated and free.

SOFT PARTS.—Bill, tip black, rest, lores and round eyes pink (juv. lead-colour); legs and feet deep pink (juv. lead-colour to pale brown); iris lemon-yellow (juv. brown).
*H.F.W.*

**Characters and allied forms.**—Very long neck and legs, bent bill, pinkish-white body and pink and black wings easily distinguish species. *Ph. r. ruber* and *chilensis*, which are more brilliant and vermilion, inhabit parts of America. *H.F.W.*

## Order ANSERIFORMES.

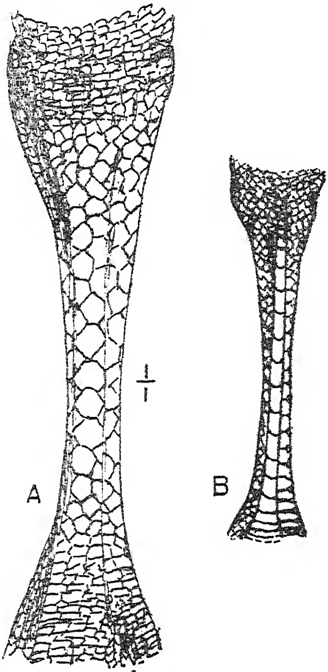
Includes the swans, geese and ducks (sub-order Anseres) and the externally very different-looking screamers of S. America (sub-order Anhimæ).

Desmognathous. Basipterygoid processes present, articulating with the pterygoids far forward. Sternum with one pair of incisions, often closed to foramina, no spina interna. Holorhinal, nares pervious. Carotids paired. Cæca more or less well-developed except in *Mergus*, where they are reduced. Syrinx with two pairs of extrinsic muscles. Ambiens present. Primaries 11, but first reduced. Diastataxic. Aftershaft reduced or absent. Oil-gland tufted. Young nidifugous with thick down. Eggs unspotted.

The Anhimæ, though their relationship to the Anseres is obvious in their anatomy, are quite un-duck-like in appearance. They lack the characteristic bill and tongue of the ducks, have unwebbed feet with long hind toe, thick uniformly disposed feathering not distributed in definite tracts or pterylæ, and other special features. The characters of the Anseres are given below.

## Sub-order ANSERES.

Swans, geese and ducks, including the "saw-bills" (*Mergus*). Anseriformes with characteristic bill sufficient to distinguish them from all other European birds. It is covered with thin skin and has at tip a horny plate shaped like a finger-nail and termed the "nail," while edges of mandibles are set with rows of horny lamellæ and tongue is bordered with spiny processes. Frequently a pair of openings or fontanelles in occipital region of skull. Lower jaw with long hooked posterior process. 16–25 cervical vertebræ. Sternum with moderately developed spina externa. Pectoral muscles united across middle line ventrally to sternal keel. Feet with front toes connected by full webs, hind toe set higher up than rest. Tarsus reticulated in *Cygnus* and *Anser*, in ducks with row of scutes along front. The males (but not females) of practically all ducks except *Melanitta nigra*, but not, amongst European forms, of the swans or geese, have syrinx expanded to form an asymmetrical resonating chamber differing in the various species. In surface-feeding ducks it is fully ossified, but in the diving ducks, including *Mergus*, it has a fenestra closed by a membrane. The males of some species also have a bulbous enlargement of the trachea some way in front of the syrinx. Muscle formula ABX. Wing-quills moulted simultaneously. Rectrices 14–24. A rich covering of down under the feathers. A copulatory organ present. The great majority are more or less markedly aquatic and coition takes place on the water.



Tarsus of A. Grey Lag-Goose (*Anser anser*), B. Mallard (*Anas platyrhyncha*), to illustrate reticulated tarsus of swans and geese and partially scutellated tarsus of ducks.

Popular division into ducks, geese and swans cannot be maintained and therefore only one family is accepted.

## Family ANATIDÆ.

With the characters of the sub-order Anseres.

**Note.**—The descriptions of the swans, geese and ducks are taken from those made with such care by the late Mrs. A. C. Meinertzhagen (née Jackson) and published in *A Practical Handbook of British Birds.* Where any revision has been found advisable this is indicated in the initials at the end of such description.

### Genus CYGNUS Bechst.

CYGNUS Bechstein, Orn. Taschenb. Deutschl., ii, p. 404 (1803—Monotype : *C. olor*).

Remarkable for its white colour and long neck, which surpasses body in length or equals it. Tarsus rather short, reticulated. Lores in adult bare. Nail not occupying entire tip of upper mandible. Tail short, rounded to almost cuneiform. Hind toe not lobed. Trachea in some species (*e.g. C. cygnus, bewickii*) penetrating and forming a loop inside the sternum. Sexes alike, young brownish-grey or greyish-brown. 6 species of which 3 Palæarctic, 1 Neotropical, 2 Nearctic.

*PLATE 76.*

## 300. THE WHOOPER SWAN—Cygnus cygnus (L.)[1]

ANAS CYGNUS Linnæus, Syst. Nat., ed. x, i, p. 122 (1758—Europe. Restricted typical locality : Sweden).
*Cygnus musicus* Bechstein, Yarrell, iv, p. 308 ; Saunders, p. 413.
*Cygnus cygnus* (L.), Pract. Handb., ii, p. 227.

**Habitat.** — In breeding-season, moorland and tundra lochs, hill tarns, swamps, valleys and deltas of arctic rivers. Outside breeding-season largely on sea-coast, especially sheltered bays or estuaries and brackish lochs, but also inland on lakes, meres, larger rivers, flood-waters, etc., and indeed on any open waters that might be frequented by more or less wild Mute Swans. *B.W.T.*

**Field-characters and General Habits.**—For general characteristics of swans, see under Mute Swan. Whooper differs from that species in *bill, which is yellow at base and black at tip and lacks basal knob, and in stiffer, straighter carriage of neck when swimming,* as well as in strong development and constant use of vocal powers. In these features it resembles Bewick's Swan, from which it differs in larger size (nearly as big as Mute), *greater extent of yellow on bill, which extends in a wedge to below nostril or beyond* and in *note* (*q.v.*). Young birds are greyer than young Mutes, with bill a dirty flesh-colour, blackish at tip, but basal part soon begins to show yellowish. Head sometimes stained reddish by feeding in pools containing peroxide of iron. Total length *c.* 60 ins. ; body *c.* 30 ins.

Flight, mode of feeding and general characteristics much as Mute Swan (*q.v.*), but does not arch wings over back when angry, while in flight wings produce merely the swishing sound common to many large birds and not the singing metallic throb of the Mute Swan. This assists in recognition of birds in flight, since wing-music of Mutes is audible over a mile under good conditions, but Whoopers at close range " make no more noise than a Sheld-Duck " (J. W. Campbell). Walks much better than Mute Swan, lifting feet high and moving briskly. On land neck may be carried stiffly erect as on water and is often bent rather sharply back for considerable distance and then turned up, but can also be more gracefully curved; usually looks longer and slenderer than Mute Swan's. Outside breeding-season regularly in parties and flocks, sometimes of considerable numbers; in O. Hebrides flocks of 60–100 and sometimes more are not unusual (Campbell). Never colonial when breeding, though non-breeding young birds remain in parties in summer (B. Hantzsch). When travelling far flocks frequently fly in oblique lines or Vs, but in O. Hebrides parties rarely adopt any definite formation (Campbell). Same observer states that he has never seen them, even when migrating, flying out of gunshot above ground, but on E. coast and elsewhere they often fly high when crossing land. Feeds both by day and night, and flighting movements at dusk and dawn are influenced, as in ducks, by tide and moon; at dusk often collects in large parties, which are generally very noisy (Campbell). According to O. Heinroth Whoopers in captivity generally get the better of Mute Swans, since in an attack they lose no time in preliminary posturings, but wild birds are generally far less quarrelsome than Mutes, rarely molesting other species. Appears to be quite insensitive to scent of man, but eyesight is extremely acute. *B.W.T.*

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[1] The swan breeding in Iceland has been separated under the name of *C. c. islandicus* as being smaller than the typical form, but very few have been measured (most of them unsexed), and until more measurements are available of sexed birds from Iceland and from breeding quarters of the typical form the distinctions must be doubtful.

**Voice.**—Typical call on the wing is described as loud bugle-like double note, rendered as "ahng-hā," "whōōp-a," etc., second syllable higher-pitched than first, repeated several times in succession, with slight pause between each double call, and more subdued versions are used on the water, subject to various modulations and variations. Has other notes, described in detail by E. Christoleit (*Journ. f. Orn.*, 1926, pp. 476–80). These are mostly forms of the short, high-pitched, "conversational" note ("kloong" of Naumann) typically used in flight (not by solitary birds) either singly or in quick sequences of 2–3, rarely 3–4, of uniform pitch or with second note higher; also (with variations) on the water; well marked variants are: longer connected sequence of similar, but feeble notes (up to 6) with peculiar twittering-trilling, or at times more rolling, effect ("kilkliih," Naumann, is one form of this), expressing excitement, anger or alarm; sequence of 4–6 lower-pitched notes of medium strength somewhat recalling gobbling of turkey, impatience; deeper versions with strong "r" sound. Alarm-note rendered "krow" is harsh, excited variant of ordinary call; has also comparatively feeble, croaking "koock" used on water (Christoleit). Attempts at rendering the different sounds in words are not, however, very satisfactory. On breeding-ground has rather weak, nasal, goose-like alarm (probably=the "kilkliih" note, though really hardly possible to syllabify), deeper in male than in female, while former has a low, but quite musical little song of about seven distinct notes, rising slightly, then falling, and rising again (F.C.R.J.). According to H. W. Robinson, legend of song of dying swan has some basis in this species, the final expiration of air from long convoluted wind-pipe producing a wailing, flute-like sound given out quite slowly. *B.W.T.*

**Display and Posturing.**—Does not arch wings like Mute Swan, though occasionally when excited wings may be raised to a less extent. Aggressive attitude is with partly spread wings held out from body; when about to attack head is generally held very low, so that if bird is on the water it may be actually submerged! At intervals bird suddenly rises in water, paddling vigorously with feet. After intruder has been driven off male and female indulge in greeting ceremony or celebration (*cf.* geese, p. 182) with wings held out, but only slightly spread, head moved up and down and prolonged, mournful-sounding note (O. Heinroth; figs., *Die Vögel Mitteleuropas*, Bd. iii, pl. 231). Similar behaviour is frequent in the winter gatherings, birds paddling forward with wings held out and being much addicted to greeting fresh arrivals on the water in this way (J. W. Campbell). Exhibits much more excitement in display than Mute Swan. Male approaches female calling vigorously and with characteristic head movements, beginning as regular up and down movement of bill, but gradually becoming a sinuous motion of whole head and neck, in which head is lowered to level of breast and then raised again, while opened wings with primaries laid back are at first moved tremulously and later waved. If female responds both birds rise up breast to breast, head and neck stretched straight upwards, with vigorous wing-beating and loud notes. Observed end March to mid-April in winter-quarters (E. Christoleit). Display may also play part in aggressive behaviour; Christoleit describes pair pitching and starting display close to a party, from which another pair separates and approaches newcomers, birds displaying at one another, but instead of rising breast to breast, as when display is purely sexual, wings are suddenly spread out on water, after which performance either peters out or males (sometimes also females) attack. Preliminaries to coition as in Mute Swan (*q.v.*), but has not the post-coitional performance of that species (Heinroth). *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds on islets in lakes or drier patches in swamps. *Nest.*—A large heap of mosses and marsh plants, partly solidified with mud and with a depression in the middle. Sometimes same nest may be added to and used again, but old nests remain visible as solid mounds for years after they have ceased to be used. Both sexes take part. Male observed to bring material (in confinement); female actually builds (F. Faber). Down white, sprays very large: feathers white. *Eggs.*—Usually 5–6, but 4–7, and even 8 have been recorded: elongated ovoid, creamy-white when first laid but soon becoming nest-stained: exceptionally said to occur with bluish tinge. Average of 48 eggs from Iceland (*C. c. islandicus*), 113·4×72·22. Max.: 126·3×71·3 and 110·7×76. Min.: 105·2×72 and 111×68·1 mm. 25 eggs from N. Europe average 112·78×73·74. Max.: 117×74 and 115×76·2. Min.: 109·5×72·7 and 112·1×69·5 mm. Average weight 40·83 grams (33–47 gr., E. Rey). *Breeding-season.*—Usually late May or early June in Iceland; exceptionally early May in Finland, depending on altitude, high-lying lakes not thawing till June. *Incubation.*—Eggs laid on alternate days (in confinement): did not begin till third day after completion of clutch (C. Kerbert) by female alone, male on guard. Period 35–42 days; once 31 days (in confinement, Holland). *Fledging.*—Young tended by both parents: fully fledged in about two months (B. Hantzsch). Single-brooded. *F.C.R.J.*

**Food.**—Almost entirely vegetable matter, though worms, fresh-water Mollusca and aquatic insects are taken in small quantities. In Iceland leaves of water-buttercup (*Ranunculus paucistamineus*) and seeds of cotton-grass (*Eriophorum scheuzeri*) recorded (B. B. Roberts); also grasses, even half-withered, roots and stems of aquatic plants, etc. In winter *Glyceria* *fluitans* and *G. aquatica* in Scotland; *Trifolium repens* recorded in Germany. *F.C.R.J.*

**Distribution.** — *British Isles.* — A few pairs breed Scotland, otherwise winter-visitor (Oct.-Nov. to March-April, occasionally May, June and Aug.), bred W. Perths 1919 and probably 1918, also W. Highlands 1921 and probably previously and has bred elsewhere in Highlands. Pinioned birds bred Shetlands 1910 and one or two subsequent years. Used to breed Orkney and some now regularly present summer but do not breed. Attempted to nest Norfolk, 1928. [Pair reported nesting Northumberland 1923 were Mute Swans.] As winter-visitor more frequent Scotland (very common O. Hebrides) and N. England than rest of England and Wales and scarcer Ireland. More abundant and more widely spread in severe winters. *H.F.W.*

**Distribution Abroad.**—Northern Palæarctic region. Typical race breeds in N. Norway and Sweden to 70°, N. Finland, Russia (north to Olonetz Govt., Kanin, R. Petchora, ? Novaya Zemlya: south to Nijni Novgorod, Viatka, Kazan, Ufa and ? Voronezh Govts.). Also in Aralo-Caspian region, Kirghiz Steppes, Turkestan, N.W. Mongolia, E. Altai, Semipalatinsk and Siberia east to Kamtschatka, Japan (one locality) and Commander Is. Apparently replaced by allied race in Iceland, formerly also Greenland. Winters south over Europe to S. Iberian peninsula, France, Italy, Albania, Greece, Macedonia, Turkey, Belgium and S. Russia (Crimea and Caucasus). Casual Balearic Is., Algeria, Tunisia, Sicily, Malta, Egypt, Palestine, Asia Minor, Cyprus, Persia, probably Afghanistan and N. India. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Entire plumage white; in some feathers of head, neck and under-parts mostly with rusty stain on edgings. No material in moult examined.

NESTLING.—Down on head, neck and upper-parts pale greyish-white, slightly darker on crown and nape; under-parts white; loral down extending on to bill nearly reaching posterior end of nostril. In three specimens examined loral extends farther forward than frontal down and that on intercrural space is produced to a point.

JUVENILE.—(*Upper-parts*) crown dark ash-brown, feathers narrowly tipped whitish; rest of head, neck and upper-parts ash-brown, paler on neck and lower scapulars, back and rump white, feathers tipped pale ash-brown; narrow line above eye and broad patch below eye white; (*under-parts*) chin, throat and fore-neck ash-white; sides of body and flanks ash-brown; rest of under-parts white, feathers of breast, belly, vent and under tail-coverts faintly edged light buff; *tail-feathers* ash-brown shading to white towards base of inner web; *primaries* and their *coverts* and *secondaries* more or less shaded pale ash-brown towards tip; innermost *secondaries* ash-brown with white bases; *wing-coverts* whitish more or less shaded pale ash-brown towards tip, innermost *median* and *greater coverts* ash-brown.

FIRST WINTER AND SUMMER.—New ash-brown feathers, some tipped or edged white at side, others whitish with grey central streaks are acquired on crown, and a few new white feathers may be acquired on mantle, scapulars, sides of body and flanks, otherwise plumage apparently as in juvenile, but very little winter material examined and none in spring and summer.

SECOND WINTER AND SUMMER.—As adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 580–628 mm. (one 577 mm.) (measured with tape, see vol. i, p. xxxiv), tail 161–180, tarsus 112–120, middle toe with claw 143–159, bill from feathers 101–112 (9 measured). ♀ wing 562–595, middle toe with claw 137–155, bill from feathers 94–103 (8 measured). Primaries:

1st narrow, pointed and little more than half longest primary-covert, 3rd and 4th about equal and longest, 2nd 10–27 mm. shorter, 5th 12–18 shorter, 6th 56–72 shorter; 2nd emarginated inner web, 3rd and 4th both webs, 5th outer web. Innermost secondaries when wing closed extend considerably beyond longest primary. Tail short, rounded, 20 stiffish feathers. Bill rather longer than head, straight, higher than broad at base, gradually depressed, edges parallel, culmen (not including concave depression) descending and almost straight to nail then decurved, ridge broad and flat at base, upper mandible with one vertical row of lamellæ, under mandible with an external and internal row; nail large and occupying almost entire tip of bill. Lores naked; upper mandible with a lateral extension on either side to anterior corner of eye; in nestling, loral down extends on to bill, and in juvenile, lores and concave depression on culmen sparsely feathered. Nostrils situated rather nearer tip than base of bill. Neck long. Trachea entering carina sterni.

SOFT PARTS.—Bill (ad.) anterior part black, including ridge of culmen below concave depression, basal part and lores yellow, yellow extending forward laterally to below middle of nares, but sometimes hardly to middle and sometimes beyond, nares black; (sometimes a blackish line or band at base of culmen bordering fore-head and extending almost from eye to eye); intercrural space yellow; bill (juv.) flesh-coloured basally, dusky terminally; legs and feet (ad.) black, (juv.) greyish, iris brown. [*A.C.M.*]

**Characters and allied form.**—Distinguished from other British swans by large size and colouring of bill. *C. c. islandicus* (Iceland) is stated to be rather smaller. *H.F.W.*

*PLATE 76.*

## 301. BEWICK'S SWAN—Cygnus bewickii bewickii Yarr.

CYGNUS BEWICKII Yarrell, Trans. Linn. Soc. London, xvi, ii, p. 453 (1830—England).
*Cygnus bewicki* Yarrell, Yarrell, iv, p. 315; Saunders, p. 415.
*Cygnus bewickii bewickii* Yarr., Pract. Handb., ii, p. 229.

**Habitat.**—Both in and out of breeding-season, much as Whooper Swan (*q.v.*). Principal European haunt in winter is probably now the Ijssel Meer (Zuyder Zee), which is (since building of closing dam) a huge, shallow, fresh-water lake. *B.W.T.*

**Field-characters and General Habits.**—Differences of Whooper and Bewick's from Mute Swan are given under Whooper, from which present species differs most notably in less extent of yellow on bill, the *yellow area being more or less abruptly truncated far behind nostril,* instead of tapering to a point below it. Extent of black on culmen varies; it may reach to base of bill, dividing the yellow into two, or it may be interrupted by a bridge of yellow. A smaller, rather shorter-necked bird than Whooper and in general stockier looking and more "goosy." Young birds are greyish like young Whoopers, but at least by end of year show the specific bill-pattern quite plainly, though duller and less clear-cut than in adults, the black dingier and the future yellow area duller, more yellowish- or pinkish-brown or brownish-yellow. At least some young birds, however, (perhaps chiefly earlier in season) have pale area considerably more extensive than yellow of adults. Total length *c.* 48 ins.; body *c.* 24 ins.

Flight and habits closely resemble those of Whooper. Flocks on the wing as a rule adopt no definite formation (F.C.R.J.). Young remain with parents till late autumn and often through winter. Visitors to inland waters are often clearly family parties and even where numerous birds can often be seen to be still in family groups. Tends to occur in larger herds than Whooper, running into hundreds in favoured localities, *e.g.* in Holland, Ireland. H. W. Robinson records a flying flock alarmed by a passing train falling half their height, " performing the most astonishing evolutions in the air like those of Plover when alarmed," but this is exceptional. *B.W.T.*

**Voice.**—Notes on water are a pleasant babble of musical sounds of which the chief sound like a short " hoo " and a longer " hō " with minor variations. A. W. Boyd also distinguishes a quiet honk or " wah," and G. C. S. Ingram and H. M. Salmon describe peculiar grunting notes preparatory to taking wing. In flight notes are louder, more honking, but softer and on the whole lower-pitched than Whooper's, while alarm is rendered by H. W. Robinson as loud, sharp, barking " how-how-how " often repeated. Has also a goose-like hiss (Naumann). Robinson records crooning song, consisting of full octave, ascending and descending the scale, very quiet and not heard beyond 50 yds., with intake of air sounding like a deep sigh ; heard in winter-quarters, chiefly at night. *B.W.T.*

**Display and Posturing.**—Like Whooper lacks the arched-wing aggressive posture of Mute Swan. Preliminaries to coition same as in that species, but without subsequent erect posture (O. Heinroth). J. Larsen describes and figures (in E. L. Schiöler, *Danmarks Fügle*, i, p. 386) pair twining necks together, then male seizing female's shoulder, turning round in water and finally treading her, act being followed by wing-flapping of both birds. Sinuous display movements of extended neck observed in flocks in mid-winter (L. S. V. Venables and B.W.T.). *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds on islets in estuaries of large rivers or near shallow water on low-lying shores and sometimes several pairs may nest in a limited area. *Nest.*—A large, smooth and symmetrically built conical mound, chiefly of clumps of moss with a few lichens and a fairly deep depression for the eggs, with some down, about 2 ft. 6 ins. high. *Eggs.*—3 to 5, probably 4 is normal; elongated and rather pointed ovoid, creamy-white at first, but readily stained. Average of 25 authentic eggs, 102·39×67·61. Max.: 108×66·4 and 106·6×71. Min.: 94·5×68·1 and 101·8×64·6 mm. *Breeding-season.*—Laying begins about June 10. *Incubation.*—No reliable data. *Fledging.*—Young tended by both adults. Single-brooded. *F.C.R.J.*

**Food.**—Practically entirely vegetable matter, though part of a small fish has been recorded and remains of water-insects: seeds, pond-grass, aquatic plants, *Potamogeton*, *Trifolium repens*, etc. recorded. In Holland main food rhizomes of aquatic plants (*Potamogeton pectinatus*, *Zannichellia pedicellata* and *Zostera marina*) (G. A. Brouwer and L. Tinbergen). *F.C.R.J.*

**Distribution.** — *British Isles.* — Winter-visitor, Nov., occasional Oct., to March-April. Fairly frequent England and Wales, especially in severe winters when occasionally numerous (as in 1938–9), and sometimes occurs in some numbers in parts of Scotland (now scarce O. Hebrides, J. W. Campbell). In Ireland more numerous than Whooper Swan, regular visitor to parts of Ulster, Connaught and co. Kerry, and in severe winters more numerous and more general. *H.F.W.*

**Distribution Abroad.**—N. Palæarctic region. Typical race breeds in Russia east of Kanin peninsula, Kolguev, Waigatz, Yalmal, Novaya Zemlya and along Siberian coast east to R. Lena. Replaced by an allied race (*C. b. jankowskii*) in E. Siberia from Lena estuary to Sakhalin. The typical race occurs in Scandinavia, Finland and N.W. Russia, in south to Belgium, Holland, Germany, Italy, Caspian and Aral Seas, Turkestan, Semipalatinsk and Altai. Accidental in Spitsbergen, France, Switzerland, Algeria, Yugo-Slavia and India (3 times). Eastern race winters in China and Japan. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Entire plumage white, feathers of head and under-parts in some with rusty stain on edgings. This plumage is apparently acquired by a complete moult; one (ad. ♂ Novaya Zemlya, Sept. 1, 1902, in Tring coll.) has remiges of both wings in quill, and is in full moult on upper- but not under-parts, one (ad. ♀ Jan. 13) is moulting body-feathers; very little moulting material examined.

NESTLING.—Like nestling *C. cygnus*, but apparently loral down, though extending slightly farther than frontal down, does not extend so far on to bill as in *C. cygnus*: down not extending so far on to intercrural space as in *C. cygnus* and not produced to such a sharp point at tip.

JUVENILE.—None in fresh plumage examined. Two (March) have juvenile feathers of upper-parts paler, and wings and tail much paler than in *C. cygnus*.

FIRST WINTER AND SUMMER.—Acquires some white feathers on mantle, scapulars and upper tail-coverts, one (♂ 14.3.20 coll. E. L. Schiöler) has acquired new white mantle and scapulars and innermost secondaries and apparently one new pair of tail-feathers; rest of plumage as in juvenile. Very little material examined.

SECOND WINTER AND SUMMER.—Probably as adult but no material examined.

MEASUREMENTS AND STRUCTURE.—♂ wing 515–537 mm. (measured with tape, see vol. i, p. xxxiv), tail 150–168, tarsus 100–115, middle toe with claw 127–138, bill from feathers 90–98 (8 measured). ♀ wing 475–525, middle toe with claw 107–137, bill 84–95 (7 measured). Primaries: 1st narrow and more than half longest primary-covert, 3rd and 4th about equal and longest, 5th 15–24 shorter, 6th 60–72 shorter. Other structure as in *C. cygnus*.

SOFT PARTS.—Bill (ad.) base of upper mandible yellow, yellow extending along culmen to below concave depression but laterally not to nostrils; black line at base of culmen bordering fore-head, in some extending from eye to eye, in some base of culmen entirely black and sides of bill only yellow, in others culmen black with a bridge of yellow above concave depression, rest of bill black, sides of rami of under mandible yellow, intercrural space yellow; bill (juv.) base of upper mandible to nostrils livid white, culmen mottled pink-brown, yellowish along ridge, tip, nail and edges of upper mandible blackish, intercrural space livid flesh-colour, mottled black along rami; legs and feet (ad.) black, (juv.) dirty yellowish-white or horny, each scale surrounded greyish-black; webs on upper surface black mottled white; iris brown. [*A.C.M.*]

**Characters and allied forms.**—Distinguished from *C. cygnus* in all plumages by smaller size and yellow at sides of bill not extending to nostrils. *C. b. jankowskii* (E. Siberia) is said to be larger with a broader bill. [*A.C.M.*]

*PLATE 76.*

## 302. THE MUTE SWAN—Cygnus olor (Gm.)

ANAS OLOR Gmelin, Syst. Nat., i, ii, p. 501 (1789—Russia).

*Cygnus immutabilis* Yarrell, Proc. Zool. Soc., London, 1838, p. 19 (Description of specimen shot on the Medway, with paler feet, and to which are attributed the white young which occur sometimes in semi-domesticated Mute Swan).

*Cygnus olor* (Gmelin), Yarrell, iv, p. 324; Saunders, p. 417; Pract. Handb., ii, p. 231.

**Habitat.**—Birds of semi-wild stock of Brit. Is. and western Europe occur on almost any sort of open, still or slow-moving waters providing supply of vegetation at depths which they can reach, and also frequent sheltered portions of coast, even breeding on sheltered sea-lochs. Pairs of more or less tame, but full-winged birds breed on comparatively small ponds and artificial waters in both country and town parks. Wild birds on Continent frequent mostly marshy lakes and meres or reedy lagoons and in winter numbers resort to sea-coast, frequenting chiefly sheltered bays and estuaries. *B.W.T.*

**Field-characters and General Habits.**—Swans are at once distinguished from other Anseriformes by their large size, pure white plumage and long slender necks. Mute Swan differs from Whooper and Bewick's Swans in having *orange bill with base, including prominent knob* (*smaller in female than in male*), *black*, while the other two have bill black at end and yellow at base. It also carries neck in a more graceul S-shaped curve. Legs blackish. Downy young grey. Juveniles are dingy brownish and have more or less grey bills without knob and lead-grey legs ; the succeeding plumage also shows more or less brownish. A variety occurs, the so-called " Polish Swan " ("*Cygnus immutabilis*" of Yarrell), in which cygnets are white from the first. Total length *c.* 60 ins. ; body *c.* 30 ins.

Flight of all swans is similar, with neck fully extended and slow, regular and powerful wing-beats, pinions producing in present species a musical, humming throb difficult to describe, but very distinctive and audible for a considerable distance. Neck is held erect preparatory to taking wing and they rise with some effort, flapping along surface of water before getting clear. Flocks generally fly in oblique lines. Gait a rather awkward, waddling walk. Sociable outside breeding-season and often seen in parties, but in Brit. Is. except locally at places like Abbotsbury Swannery, large numbers are not often seen together. On Continent wild birds occur in winter-quarters in very large flocks, and at Lake Tåkern, the well-known Swedish breeding-place, spectacular flock (*c.* 1,500–2,000 in June 1932) of presumably mainly non-breeding birds may be seen at all hours of day throughout summer. Feeds by dipping neck under water, but also by " up-ending " in duck-like fashion. Adults hardly ever dive even when wounded or hard pressed, though downy young can do so, and case is recorded of cygnet old enough to pinion diving when cornered, holding wings to sides and using feet only (J. C. S. Ellis). E. Christoleit records adults diving in play, but this is very unusual. Mute Swan, much more than Bewick's and Whooper, is naturally predisposed to association with man and easily tamed ; O. Heinroth found that behaviour of wild-caught birds from Black Sea differed in no respect from that of semi-domestic swans. Usually aggressive and vicious towards other birds in the semi-artificial conditions in which it often lives, but both Naumann and E. Christoleit stress that this trait is less noticeable in fully wild birds. Well-known aggressive posture with wings arched over back (see under " Display ") is not shared with the other two species. A trick of birds on water of extending one leg backwards and sideways with web expanded in order to dry it before adroitly bringing it forward to insert it under cover of flank feathers without wetting again is, according to Heinroth, peculiar to present species and Black Swan. Tail is often wagged, but with more swinging action than in ducks. Young sometimes carried on back of parents. *B.W.T.*

**Voice.**—Compared with the other two species is a silent bird. Note when irritated or when nest or young threatened is an explosive, snorting sound subject to some variation. Has also a shriller note, likewise somewhat variable, which may precede and merge into the snorting note. This compound note may be quite loud and resonant and a form of it is possibly the note described by Naumann as a loud trumpeting sound, said to be heard from wild birds in breeding-season, but rarely from tame ones. Also hisses. Usually silent in flight, but E. Christoleit states that all the notes may be heard on the wing. Cygnets have feeble, shrill, peeping note. *B.W.T.*

**Display and Posturing.**—In characteristic aggressive attitude (chiefly adult male in and near breeding-season) neck is drawn back and elbows raised so that secondaries are arched over back, while bird advances towards intruder in succession of jerks by moving both feet at once. In certain circumstances this normally hostile posture may be assumed by mated birds towards one another; thus after driving off intruder male will return in this manner to female, which responds similarly, but when breasts are almost touching heads are suddenly stretched straight upwards and then returned to normal, while both utter prolonged snoring note. Affection or friendliness is expressed by attitude in which base of neck is in contact with water for some distance while head and neck appear peculiarly thickened and rest of plumage is laid close to body. No true "courting" display; choice of mates takes place towards autumn apparently without externally recognizable signs; it can merely be seen that on meeting birds assume friendly posture and that soon they keep permanently together. Before coition birds approach in this attitude, bring heads close to one another and then begin to dip heads under water and quickly withdraw, repeating this many times, one bird often performing this dipping across base of other's neck. Female gradually flattens herself and sinks deeper in water with neck half extended, when treading takes place, male holding on to feathers of upper part of female's neck with bill, whole act lasting *c.* 3–5 secs.; accompanied by prolonged snoring note from female. Immediately afterwards both birds rear up breast to breast with peculiar snoring note and treading water vigorously, and then sink down again, male sometimes raising secondaries, but not in the exaggerated manner of the threatening attitude. Finally prolonged bathing takes place, followed by preening (O. Heinroth). Both pre- and post-coitional performances may, however, be almost omitted (E. Christoleit). C. Popham has observed birds "twining necks in a caressing way" before coition, but this appears to be unusual. See, especially, Heinroth, *Verh. d. V. Internat. Ornithol.-Kong., 1910*, pp. 592–602. *F.C.R.J. & B.W.T.*

**Breeding.**—In wild state usually nests on islets in swamps or in shallow water in reed-grown lagoons, but in semi-domesticated state almost anywhere near water, sometimes in colonies of great size. In protected areas of this kind, the nests may be only a few yards apart. *Nest.*—A large heap of reed-stems and roots of water-weeds, sticks, rushes and vegetable matter of any kind, roughly circular in shape and built like a shallow truncated cone. Both sexes take part, male bringing material in bill and female taking it and arranging and shaping depression for the eggs. *Eggs.*—Usually 5 to 7 but cases of 8 to 12 recorded: also exceptionally 4 only. Some cases of high numbers undoubtedly due to two unmated females laying together. Colour not white, but with a greyish or bluish-green tinge: melanistic eggs have been recorded: shape rather elongated oval. Average size of 68 eggs (25 by E. Rey, 7 in Naumann) 115×74·14. Max.: 124·3×72·3 and 119×80. Min.: 105×73 and 112×70 mm. *Breeding-season.*—Usually in second half April, exceptionally rather earlier, sometimes not till May in Brit. Is. *Incubation.*—According to O. Heinroth, eggs laid on alternate days: confirmation desirable: incubation begins before completion of clutch in some cases: others hatch about same day: female broods for greater part of time, but male takes her place while feeding, chiefly during night. Period usually 35 days, but may vary from 34 to 38 days. Longer estimates probably include part of laying time. *Fledging.*—Young remain in nest for a day or so; male often takes first hatched on water while female finishes brooding, and both sexes remain in charge of brood, female leading and tearing up roots and grasses. Young fully fledged in about 4½ months (Heinroth). Single-brooded. *F.C.R.J.*

**Food.**—Chiefly subaqueous vegetation, but also confervæ and water-weeds. *Elodea*, *Characeæ*, *Callitriche aquatica*, *Potamogeton*, *Zostera*, etc.; rhizomes of reed, arrow-head and stalks, roots and buds of other aquatic plants. Some animal matter also taken; small frogs and toads, tadpoles, worms, fresh-water Mollusca, occasionally small fish (*Alburnus*) and insects with their larvæ. Adult Amphibia and young waterfowl killed at times; in case of latter by drowning, but not eaten. *F.C.R.J.*

**Distribution.**—*England.*—Evidence for former theory of early introduction fallacious. More likely to have been originally indigenous in Lincs, Cambs, Hunts, Norfolk, Suffolk and probably Thames and perhaps other parts. Original wild stock gradually brought by capture and pinioning into semi-domestic condition, beginning prior to A.D. 1186 and ceased to exist as a wild race. From 13th to 18th centuries all Swans were property of crown and, under royal licence, of communities, corporations or private persons, and their keeping governed by a strict code of statutes, orders and ancient customs enforced through the King's Swan-Master and his deputies. Under licence marks[1] were assigned to all qualified owners by

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[1] Marks were possessions of considerable value and in most cases personal to the owner and so could be sold, given away under deed or devised by will. In some cases, particularly in E. Norfolk and Suffolk, they appertained to manors and devolved with them to successive owners and not apart from them. Swan-marks were of four kinds:—

(1) Notches along edge, or designs cut or branded on upper surface, of upper mandible. These the most usual, and those consisting of simple notches probably the oldest, and direct extensions of use on Swans of primitive yeoman's marks universally used for cattle and other stock. Many hundreds on record, varying from one simple notch to designs of considerable complexity, many based on owners' initials, calling or armorial bearings.

(2) Notches cut in edge of lower mandible. Used only in Fenland and (except for a few that survived later) up to end of 16th century only. Always used as an adjunct to (1).

(3) Leg and foot marks, consisting of holes or slits made in webs, removal of one or both hind toes, or simple design branded on tarsus. Nearly always used in combination with (1) and almost entirely confined to Fenland.

(4) Side on which pinioning was done formed part of mark on Sussex Arun, but always in conjunction with (1).

(For further details *cf. Brit. B.*, xiv, p. 176; xvii, p. 174; xix, pp. 186, 262, 294;

which their birds could be distinguished. During the 18th century custom of marking and usages appendant to it gradually died out, except to a limited extent on Thames and on Yare and Wensum (E. Norfolk), where still observed. Elsewhere Swans have since reverted to original wild state and now generally distributed, though probably all now living are descendants of mediæval semi-domestic stock. The swannery at Abbotsbury (Dorset) is not only the largest individual congregation of Swans in this country, but is unique. Though foot-marked and living under conditions to some extent artificial, the birds are all full-winged and virtually wild. Dependent to some extent on annual fluctuations of food-supply, numbers vary between under 200 and over 500 pairs. *Wales, Scotland and Ireland.*—No evidence of Swan-keeping and early history unknown. Swan not a royal bird in Scotland. Now generally distributed. Wild migrants may occur. *N.F.T.*

**Distribution Abroad.**—A Palæarctic species. Breeds in Europe in a wild state in Denmark, central and S. Sweden, N. Germany, E. Prussia, Poland, Romania (Dobrogea), Russia (Voronezh Govt. (rare), Black Sea dist. ?, Lower Volga and Perm Govt.). Also Asia Minor, E. Persia, N. Caspian dist., Kirghiz Steppes, Akmolinsk, Amu-Darya, Aral Sea, Turkestan east to Mongolia and E. Siberia, Ussuria. Occurs as migrant middle Europe, west to Belgium, and in winter in E. Mediterranean region and S.W. Asia; occasionally N.W. India. Accidental in Norway, Finland, France, Spain and Italy. Also in semi-domesticated state in many places. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Entire plumage white. This plumage is acquired by a complete moult in autumn; remiges of both wings are shed together apparently before moult of body and tail commences.

NESTLING.—Down on crown, nape, upper-parts and sides of body and uropygial tuft pale greyish-brown, under-parts white. Frontal down in two specimens examined extends slightly farther forward than loral down; down on intercrural space rounded in shape at tip and not extending so far on to bill as in *C. cygnus*.

JUVENILE.—(*Upper-parts*) crown hair-brown, feathers tipped white; nape, sides of face and neck whitish intermixed with pale drab-brown feathers, in some nape and sides of neck more or less pale drab; mantle, scapulars and upper tail-coverts when fresh hair-brown fading to drab, lower scapulars white, more or less suffused pale drab towards tip; on centre of mantle, back and rump some feathers white more or less suffused pale drab at tip; (*under-parts*) chin, throat and fore-neck more or less white, in some suffused palest drab; sides of body and flanks pale drab; rest of under-parts white, in some suffused pale drab; *tail-feathers* drab shading to whitish at base; *primaries* and all *secondaries* more or less suffused pale drab; *primary-coverts*, all *wing-coverts* and bastard-wing whitish more or less suffused and tipped pale drab, *greater coverts* with inner webs paler.

FIRST WINTER AND SUMMER.—Apparently moults in a dark ash-brown head like that of juvenile and acquires a certain amount of new white body-feathers, but very little material examined.

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xxii, p. 74. *Trans. Norf. and Nor. Nat. Soc.*, xii, pp. 17, 424, 581; xiv, p. 229; *Proc. Suff. Inst. Arch. and Nat. Hist.*, xxi; *Surrey Arch. Col.*, 38; *Berks. Arch. Jour.*, 36; *Trans. Herts. Nat. Hist. Soc.*, xx; *Lond. Nat.*, 1933, p. 67; *Arch. Cant.*, xlvii; *Proc. Cambs. and Hunts. Arch. Soc.*, v; *Peterborough Nat. Hist. Soc. Rpt.*, 1933; *Archit. and Archæol. Soc. of Lincs.*, xlii; *Trans. Oxfords. Arch. Soc.*, 82, 1937). *N.F.T.*

SECOND WINTER AND SUMMER.—Probably as adult but not examined.

MEASUREMENTS AND STRUCTURE.—♂ wing 560–622 mm. (measured with tape, see vol. i, p. xxxiv), tail 189–198, tarsus 98–120, bill from knob 70–85, middle toe with claw 142–163 (10 measured). ♀ wing 535–570, bill from feathers 73–90 (9 measured) (Schiöler). Tail wedge-shaped, 22–24 stiff feathers. Bill as in *C. cygnus* but upper mandible with a knob at base which becomes much enlarged in spring, is merely a slight protuberance in female and perceptible in juvenile; culmen without concave depression, nail oblong, small and not nearly occupying whole culmen. Nostrils rather nearer base than tip of bill. Juvenile with loral feathering scanty. Trachea not entering carina sterni which is simple. Other structure as in *C. cygnus*.

SOFT PARTS.—Bill (ad.) pinkish-red tinged orange, nail, knob, area around and behind nostrils, base and cutting edge black, under mandible black basally with an irregular flesh-coloured area towards tip; bill (nestling) black with yellowish nail; legs and feet dark grey; iris hazel. [*A.C.M.*]

**Characters.**—No subspecies. Distinguished by large size and coloration of bill. Adult male in breeding-season with enormously enlarged knob at base of bill. [*A.C.M.*]

[NOTE.—Four out of a flock of five American Trumpeter Swans, *Cygnus buccinator* Richardson, were shot at Aldeburgh (Suffolk) on Oct. 27, 1866 (Yarrell, iv, p. 322; C. B. Ticehurst, *Hist. Birds Suffolk*, p. 265). The bird breeds from British Columbia to the western shore of Hudson Bay. Examples of the American Whistling Swan, *Cygnus columbianus* Ord, are stated, "on weak evidence," to have been found in shops of Edinburgh poulterers (Yarrell, iv, p. 322; Saunders, p. 416).]

## Genus ANSER Briss.

ANSER Brisson, Orn., i, p. 58 (1760—Type "*Anser*"=*Anser anser*, by tautonymy, according to Brisson, Orn., vi, p. 261).

Bill high at base, about same length as head, cutting edge of upper mandible decidedly concave, serrations strong, tooth-like, visible from outside, adapted to biting off grass and plant-stems. Nostrils longitudinal, about middle or little behind middle of bill. Nail occupying entire tip of upper mandible. Feathers of neck narrow, slightly elongated and somewhat convex, so that neck appears furrowed. Wings long and pointed, 3rd primary longest, 4th a little and 5th much shorter. Tail short, rounded, 16–18 rectrices. Eggs white. About 13 species, Palæarctic and Nearctic.

**British Distribution of Geese.**—The distribution of the various species of geese and especially the grey geese in this country is constantly subject to change—one species being predominant in one area for some years and another in another series of years, some localities being forsaken and others being occupied, etc. I have in the following accounts endeavoured to give, with assistance of friends, the distribution as it is at the present day. *H.F.W.*

*PLATES 77 and 77a.*

## 303. THE GREY LAG-GOOSE—Anser anser anser (L.)

ANAS ANSER Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—Europe. Restricted typical locality: Sweden).

*Anser palustris* Fleming, Hist. Brit. Anim., p. 126 (1828—"Breeding in the fen countries of England").

*Anser cinereus* Meyer, Yarrell, iv, p. 253; Saunders, p. 397.

*Anser anser* (L.), Pract. Handb., ii, p. 233.

**Habitat.**—In breeding-season in north haunts hilly heather moors and "flow" country with scattered lochs, and also breeds (unlike other grey geese) on small islands well out to sea; otherwise chiefly extensive and secluded marshes and fens with good cover of reeds, rushes, willow-thickets, etc., or lakes and fresh waters bordered by ground of this type or with secluded islands; in unfrequented regions sometimes even on small streams with suitable cover on banks (S. Alphéraky). Outside breeding-season frequents salt and fresh marshes and marshy grasslands, bogs, peat-mosses, etc., largely near estuaries and low-lying coasts, but also near lakes, lagoons, rivers, and inundated country from coast to long distances inland; also partial to fields of young grain, stubble, beans and other cultivation (rice-fields abroad), usually retiring at night to shoals and sandbanks on coasts or in rivers or to secluded lakes and pools. *B.W.T.*

**Field-characters and General Habits.**—"Grey geese" are at once recognized as such by their obvious resemblance to the farm-yard bird, but the several species are much alike and cannot be distinguished when merely seen flying high overhead. With glasses at reasonable range on the ground or passing low enough on the wing typical adults are distinguished by well-defined characteristics, but immaturity and individual variation, which is considerable, introduce complications. In general habits and behaviour they are all much like the present species (see below), and essential colouring is similar in all, grey-brown with lighter margins to feathers of body, white upper and under tail-coverts, and grey tail with white tips, largely overlapped by white coverts, so that effect in flight is of white tail, with broad dark subterminal band.

Grey Lag is largest species and almost exactly like its domestic derivative, except that wild bird is more lightly built and agile. Characterized by *large, stout bill and heavy head, noticeable in air as well as on ground, and pale grey fore-wing and rump*, the former conspicuous on ground when stretching wing and also often very striking in flying birds. (Observe, however, that Pink-foot also has distinctly pale fore-wing and further that this character may be quite masked in geese flying against bright sky, when whole bird appears dark.) *Bill bright orange with no black* and with white or sometimes brownish nail; sometimes a little white feathering at its base. Legs flesh-coloured. Head and neck not darker than body. Breast often spotted or blotched with black, sometimes heavily, but not barred as in White-front. Spotting sparse or absent in immature birds, which also have more greyish legs. Total length *c.* 30–35 ins.; body *c.* 19–20 ins.

Flight direct, with regular wing-beats and quite swift—faster than it appears. Flocks moving some distance or migrating fly in a V-formation (apex forward) or in trailing lines, each bird maintaining regular distance from its neighbour and, according to experienced sportsmen, an old bird always acting as leader. On shorter flights formation is often much more irregular, but birds maintain their even spacing. They rise easily from ground, preferably, but not necessarily, into the wind and almost vertically if occasion requires, but not so easily from water. Preparatory to settling they plane down in wide sweep with wings extended, braking when about to pitch, with wings turned sharply forwards and downwards and spread tail, and dropping almost vertically with vigorous rotary action of wings. Flocks of this and other species of grey geese sometimes perform striking evolutions, birds plunging through air in kind of spiral nose-dive with wings half folded or tilting over and side-slipping in a remarkable manner (termed "whiffling" by sportsmen). Intention to take flight is indicated by jerky, side-to-side movement of bill, becoming more and more rapid till bird takes wing (Heinroth). All grey geese are essentially birds of open country and purely terrestrial, never perching even on low objects, walk easily and well with none of the waddle of tame bird, and can run with some speed when unable to fly during moult. Outside breeding-season they are thoroughly gregarious, and though odd stray birds or pairs may be met with at times they are normally seen in company, from parties of half-a-dozen or so to flocks of hundreds and even thousands. Immature non-breeding birds may remain in flocks in summer on or close to breeding-ground. As moult of adults approaches they resort, along with young ones, to the most secluded localities, to marshes or mosses with good cover or in O. Hebrides largely to sea-girt islets with suitable grazing (J. A. Harvie-Brown and T. E. Buckley), to pass the flightless period. Later the family parties gradually band together and present species is in flocks again by mid-Aug. Old and young migrate together and even on return passage in spring grey geese often appear to be still in family parties. All the species are essentially land-feeders, grazing on grasslands and marshes and resorting also to greater or less extent to cultivation where available, but will at times feed in shallow water, dipping heads and "up-ending" like ducks. They are normally diurnal feeders, but when feeding-grounds are disturbed by day or where much persecuted will feed at night. Ordinarily they flight in early morning between feeding-grounds and roosting-places (see under "Habitat"), sometimes travelling as much as 20 miles inland from roosting-places on coast, but are apt to have an inactive or resting period round about mid-day, and in hot climates like India are described as flighting to water and resting during heat of day on sandbanks in rivers, etc. In some Scottish localities they are also described as often resting by day on fresh-water lochs. Where roosting takes place on inland lakes or pools they sleep usually on margins, not on water. Though much less aquatic than ducks they swim well and buoyantly. Young birds or adults when wounded or flightless during moult can dive well if in danger. All grey geese are naturally wary and suspicious and may be very unapproachable, but this depends greatly on local circumstances—*e.g.* how much they are shot at—and in some places where not unduly disturbed they may be stalked to within fifty yards or so and sometimes under favourable conditions and with sufficient precautions even as near as ten yards (P. Scott), and even feed close to roads. While flocks are feeding a few birds are always on look-out for possible danger, though accounts of a kind of organized posting of sentinels should probably not be taken too literally. *B.W.T.*

**Voice.**—Note is just like that of farm-yard bird, a loud, deep sonorous "aahng-ung-ung," when heard from large flocks often likened, as are notes of wild geese in general, to sound of hounds in cry. Notes of individuals vary distinctly and according to O. Heinroth birds that know one another easily distinguish the notes of their friends, while even a human can learn to distinguish the birds in a small captive flock in this way, but he has not made out any constant sex difference. Note has also several variants. He distinguishes the low, nasal "conversational" under-tones or contact notes, usually of 3–7 syllables, used especially when birds are moving or about to move their ground, louder and more disjointed when about to take flight, and a loud and quite distinct note especially associated with movements on foot and for some distance; also the short nasal "gang" or warning or alarm, sometimes uttered very softly, especially by birds with young, and the "triumph-note" of pairs after an intruder has been driven off, a resonant note followed by a peculiar low cackle (Heinroth). P. Scott distinguishes, in addition to the typical "aahng-ung-ung" (or "gnong-ong-ong"), in flight or on ground: an individual variant "gaah-gah-gah," a low, buzzing "ung-ung-ung-ung-ung-ung," apparently only used when small party is in flight or about to take off, a note of gander like a prolongation of French word "bain" (much like an electric motor-horn), and a note like "gah-onk" (probably a development of last), the first syllable breaking away to a high note about an octave and four notes higher than the second. The hiss of anger or aggression is also like tame birds'. *B.W.T.*

**Display and Posturing.**—Sexual life of geese has been very fully studied by O. Heinroth (*Verh. d. V. Internat. Orn.-Kong., 1910*, pp. 615–635). Fundamental characteristic which colours whole behaviour is very intimate family life (contrasted with ducks, where male takes little or no interest in his offspring). After driving off intruder all geese behave similarly; gander hurries back to mate with special "triumph-note" (see "Voice") in which she joins, uttered with neck stretched out and head close to ground. Even downy young take part, assuming same attitudes as parents. Similar behaviour is associated with courtship, which occurs in winter and only involves unmated birds, as pairing is for life. Gander paying court to goose drives off all less powerful birds from near her and returns to her with same cry. Female may not show much interest at first and they are not definitely paired until she begins to respond with same note. Coition may have taken place before this, but somewhat promiscuous relations may occur amongst unpaired birds. Coition is characterized by much the same preliminaries as in swans, birds approaching one another swimming with tail and hind part of body carried high and dipping head and neck at short intervals in water, until female lies flat on water and treading takes place, gander holding on to her nape-feathers with bill. Gander then slips off to one side and birds then face one another, male with elbows raised in peculiar manner, while both call loudly. F. Fraser Darling describes a communal ceremony at onset of breeding-season. "Six or eight birds form what may be roughly a circle ten yards across, or sometimes there will be just two groups that distance apart. A gander steps into the arena, lowers and extends his head as if in menace, begins to walk across the display ground, turns his head this way and that and appears to be hissing . . . ; he gathers momentum and finishes the distance in a run and with a flap of his wings." This may be repeated and another bird will do the same while those not taking part may or may not make small honking sounds.

Characteristic concealing posture of all grey geese when suspecting danger while on nest is with neck stretched forward on ground. Moulting birds and occasionally even individuals able to fly will assume this posture if threatened, even on water. *F.C.R.J. & B.W.T.*

**Breeding.**—In Scotland breeds on moorlands among heather with preference for islands in lochs or off the coast. Abroad may nest among dwarf willows or among reeds, on foundation of floating roots and surrounded by water.[1] *Nest.*—Usually a hollow in ground among long heather, built of heather twigs, grasses, mosses, etc., mixed with down and small feathers. Floating nests composed of dead reeds; rushes, etc., on Continent. Down sometimes rather scanty, sprays small, grey, light centres. Feathers mostly white, some light on sides with darkish grey centres. (See Plate 77A.) (The downs alone of Grey Lag, and other grey geese, are of little use in identification owing to their similarity.) *Eggs.*—Number variable: usually 4 to 6, occasionally 7 or 3 only, rarely 8; clutches of 10, 12, 14 and 15 recorded on Continent may be due to admixture of domestic strain. Shape ovate, sometimes elongated; creamy-white, often nest-stained yellowish or pale brown. Average of 100 British eggs 85·32×58·04. Max.: 94·4×59·7 and 90·2×62·5. Min.: 77×57·5 and 86·2×49·5 mm. E. Wasenius gives average weight as 19·92 grams (24 to 15 gr.); E. Rey as 21 gr. *Breeding-season.*—Usually last fortnight of April in Scotland; exceptionally early in month; in middle Europe from end March. *Incubation.*—Begins on completion of clutch; most eggs laid on consecutive days but generally a pause of one day; *i.e.* 5 eggs in 6 days; by female alone, male within range but not standing by nest. Period 27–28 days. *Fledging.*—Young pick up food after leaving nest but tended by both parents, female generally leading. Period 8 weeks. Single-brooded. *F.C.R.J.*

**Food.**—British records chiefly refer to grasses: tubers of *Scirpus maritimus* in bird from Ireland (A. B. Brooke), but corn-fields are visited in autumn at night, especially oat-stubbles. In Norway, said to eat cloudberries; young said to feed on bog-nuts and water-plants such as *Lemna* and *Glyceria fluitans* (Vasilov), while in winter-quarters fields of buckwheat, peas, lentils, rye and oats are visited, and occasionally turnips; potatoes, acorns, etc., are also eaten according to Alphéraky, who also states that *Zostera marina* is taken on the sea-coast. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Resident and winter-visitor. Used to breed Yorks, Cambridge up to 1773, Lincs and probably Norfolk to early 1800 and many parts N. Scotland. Still breeds, but is decreasing, parts Caithness and Sutherland, a few parts of northern half W. Ross-shire, larger O. Hebrides (not Barra) and Coll (I. Hebrides), and is resident in most breeding areas (as well as being a winter-visitor and passage-migrant). As winter-visitor (end Sept.–mid-Nov. to March-April, sometimes May), chiefly now (since beginning of century) parts of Perth and Stirling and between S.W. Scotland and Anglesey, also locally Kintyre and Ayrshire (small numbers) and fluctuating numbers Islay. From Northumberland to Suffolk chiefly autumn and spring passage-migrant in very small numbers, though some winter. Elsewhere has occurred in most counties as scarce or rare visitor. *Ireland.*—Winter-visitor chiefly to parts of Wexford, Wicklow, Meath, Louth, Down, Mayo, lower Shannon and W. Kerry. Rare in most other counties. Probably formerly bred Bog of Allen and Down. Young birds ringed in Iceland have been recovered in Wexford, Tyrone, Orkney, Inverness, Perth, Angus, Dumfries and Wigtown. *H.F.W.*

**Distribution Abroad.**—Palæarctic region. Typical race breeds in Iceland,

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[1] Most geese show a tendency to social breeding when undisturbed by man; in some cases due to selection of protective sites, but in others no doubt owing to additional security against smaller foes through numbers.

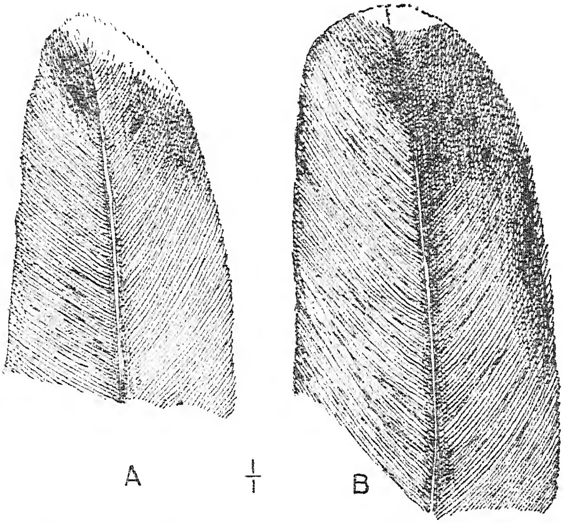
Norway to 71°, Sweden, Finland, Baltic states and Russia north to Novgorod, Viatka and Perm Govts.; also in Poland, but in E. Hungary and Romania apparently meets Eastern race. Also breeds locally in Denmark, Germany, Austria, Czecho-Slovakia, N. Yugo-Slavia and Macedonia, and has nested in S. Spain (pricked birds), Algeria (Lake Fetzara) and Friesland. Limits of Eastern race, east to Manchuria and south to ? Transcaucasia, Iraq, N. Persia, possibly N. Afghanistan to N. Tibet, Kansu and Mongolia, remain uncertain. European birds migrate to Mediterranean and N. Africa; Asiatic birds to Baluchistan, N.W. India and China. Casual Jan Mayen, Kolguev, Madeira and Azores; on passage Færoes. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—(*Upper-parts*) narrow line of white round base of upper mandible, often ill-defined or absent; crown and centre of nape ash-brown; feathers of mantle and scapulars dark ash-brown (in some with grey bloom) with brownish-white edges, narrower on scapulars, lower scapulars black-brown; back and rump ash-grey, feathers in some tipped ash-brown; sides of back, rump and upper tail-coverts white, in some central upper tail-coverts suffused ash-grey; (*sides of head* and *under-parts*) small whitish patch below eye; rest of head, chin and throat light ash-brown; lower-throat bordering upper-breast paler and feathers with greyer bases: sides of body and flanks as mantle, but feathers with broader tips of brownish-white and mostly with grey bloom; thighs pale ash-brown; breast and part of belly pale ash-grey or ash-brown, feathers tipped white or greyish-white, lower belly and vent white, varying number of black, or dark grey feathers tipped black, sparingly distributed on under-parts; under tail-coverts white; axillaries and under wing-coverts palest ash-grey; *tail-feathers* dark ash-brown with grey bloom, edged and broadly tipped white, some with inner webs more or less white, outer feathers mostly white; *primaries* brown-black with white shafts, inner webs paler towards base, outer primaries with grey bloom on basal two-thirds; *secondaries* black-brown, outer webs and tips very narrowly bordered white; all *primary-coverts*, *bastard-wing*, some outer *median coverts* and *lesser coverts* pearl-grey; outer *greater coverts* ash-grey tipped white, inner ones sepia (some with grey bloom), and narrowly edged and tipped white; rest of *median coverts* as mantle. This plumage is acquired by complete moult July to Jan., moult of remiges taking place July (all remiges are shed together) and body and tail (except for a few body-feathers) not commencing in earnest until remiges are nearly grown. SUMMER.—Coloration as winter and no moult apparent but light edges to feathers of upper-parts become more or less worn off. *N.B.*—Some males (old birds?) have more black on *under-parts* than females, but a younger male often has less black than an older female.

NESTLING.—Down on crown, centre of nape, upper-parts, sides of body and sides of thighs olive-brown, long filaments in some tinged greenish-yellow, bar across wing greenish-yellow or yellowish-white; fore-head, sides of face, sides of neck and under-parts greenish-yellow (in some area round eye more or less suffused olive-brown, in some sides of face canary-yellow and under-parts yellowish-white).

JUVENILE.—Like adult, but no white line at *base of bill*, in some *chin* white; *mantle* and *scapulars* with browner edges than in adult; *sides of body* and *flanks* pale ash-brown, feathers shading to light brown at tips, which are buffish-white; rest of *under-parts* as in adult, but with no black, though sometimes feathers of breast and belly have dark ash-brown centres or streaks and mottlings; *tail* and *wings* as in adult. (*Shape of feathers*) those of sides of neck normal without sharply pointed tips of adult, feathers of mantle, scapulars and under-parts narrower and more rounded at tip than in adult, tail- and wing-feathers, greater and median coverts narrower than in adult, tail-feathers more pointed and wing-coverts more rounded at tip.

FIRST WINTER AND SUMMER.—Like adults, but often no white line at base of bill and often with white patch on *chin ; under-parts* with no black or with only an odd black feather, sometimes some feathers marked blackish-grey. Distinguished from adults by unmoulted juvenile *wing-feathers* and *greater* and *median wing-coverts*. The juvenile body-feathers, some tail-feathers (in some no tail-feathers are moulted), sometimes some innermost secondaries and median coverts are moulted from Sept. onwards.



Grey Lag-Goose (*Anser anser*). Tips of greater wing-coverts of A. juvenile, B. adult.

SECOND WINTER AND SUMMER.—Like adults, but with less black on under-parts.[1]

MEASUREMENTS AND STRUCTURE.—♂ wing 447–482 mm., tail 129–150, tarsus 73–82, bill from feathers 56–69 (10 measured). ♀ wing 416–468, bill from feathers 54–70. (Extreme measurements, both sexes, British-taken birds : wing 400–480, tarsus 65–85, bill 54–70, nail 13–20. H.F.W.) Primaries : 1st narrow, pointed and about two-thirds longest primary-covert, 3rd longest, 4th equal or 3–5 mm. shorter, 2nd 10–19 shorter, 5th 28–31 shorter, 6th 57–65 shorter ; 2nd emarginated inner web, 3rd both webs, 4th outer web. Innermost secondaries and scapulars broad and with square tips, slightly rounded in innermost secondaries, longest of which is shorter than 5th or 6th primary. Tail short, rounded, 18, exceptionally 20, broad feathers, rather rounded at tip. Feathers of neck convex and projecting, with pointed tips, giving characteristic " furrowed " appearance. Bill about length of head, higher than broad at base, upper mandible with ridge broad and flat at base, narrowed towards end, culmen sloping gradually to circular, convex nail ; tomia distinctly arched with indentations of upper mandible quite apparent, commissure gaping widely, teeth 18–24, usually 21–22 (J. Berry). Weight 9¾ to 5½ lbs., average of 83, 7½ lbs. (H. L. Popham).

SOFT PARTS.—Bill (ad.) " orange-yellow to reddish-orange with narrow stripe of flesh-colour behind nail, along edges of both mandibles and often on culmen ridge and around nostrils, nail ivory to light horn " (R. A. H. Coombes) ; (juv.) " at first greenish-grey, changing to greenish-yellow then gradually losing green tint and acquiring coloration of adult, nail almost black at first changing to horn colour and eventually ivory.[2] Legs and feet flesh-colour, (juv.) greyish ; claws white horn to black horn, usually dark horn. Iris brown " (C. T. Dalgety). Eyelids (ad.) bright coral-pink to flesh-colour, (juv.) yellowish-white (P. Scott).

[*A.C.M.* revised by *H.F.W.*]

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[1] As shown by specimens in the collection of E. Lehn Schiöler, who proved by examination of their sexual organs that they do not breed in their first year. [*A.C.M.*]

[2] Several ornithologists intimately acquainted with geese state that they have never seen a British-taken Grey Lag with a pink bill. *H.F.W.*

**Characters and allied forms.**—Large size, stout yellow bill with white nail, pink legs and feet, ash-grey back and rump, pearl-grey bastard-wing, outer median coverts and lesser coverts distinguish species. *A. a. sylvestris* (Iceland and Norway, ? Scotland) described as having a slightly smaller bill is very doubtfully separable, and the status of *A. a. rubrirostris* (Siberia, S.E. Europe eastwards) is somewhat obscure and its distribution uncertain, but its upper-parts are paler, the feather-edges being whiter and wider and its bill is flesh-colour to rosy-pink while it tends to be larger and to be more spotted with black on belly but these two latter characters are not constant.[1] *H.F.W.*

*PLATES 77a and 78.*

## 304. THE WHITE-FRONTED GOOSE—Anser albifrons albifrons (Scop.)

BRANTA ALBIFRONS Scopoli, Annus I. Historico-Natur., p. 69 (1769—Specimen in "Museum Turrianum," presumably from N. Italy).
*Anser albifrons* (Scopoli), Yarrell, iv, p. 261 ; Saunders, p. 399 ; Pract. Handb., ii, p. 237.

**Habitat.**—In breeding-season, frequents tundra and swamps beyond limit of tree growth. Outside breeding-season much as Grey Lag, but resorts less to cultivated fields, preferring marshes and wet or flooded grasslands, bogs, saltings and the like. *B.W.T.*

**Field-characters and General Habits.**—A darker bird than Grey Lag or Pink-foot and, when adult, the most readily recognizable of the grey geese owing to *prominent white patch at base of bill and black barring on breast*, which may be very extensive. Extent of white also varies somewhat, but is rarely if ever as great as in Lesser White-fronted Goose (*q.v.* for this and other distinctions). Both above characters are lacking in young birds (though variability in older ones is not directly dependent on either age or sex), but as they are generally with adults their recognition is simplified. Fore-wing not markedly paler than rest. Bill of adult waxy white to pink, shading to yellow on culmen, with white nail, that of young dull yellow or greyish-yellow, with nail darker. Legs orange. Rim round eye brown or greyish. Total length *c.* 26–30 ins. ; body *c.* 17–19 ins.

General habits much as Grey Lag, but "more active in flight than other grey geese and possesses an astounding power of 'reversing engines' when scared. A party within 25 ft. of a shooter's head as he lies prone will shoot up perpendicularly to long gun range, if not out of it, before he can raise himself to put his gun up, and similarly they can rise almost perpendicularly from ground. No other British goose has (or exercises) this power in same degree" (William Percy). Often in large flocks of hundreds, but more apt than other grey geese to split up into family parties and small lots. Often in association with Pink-foot. *B.W.T.*

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[1] An adult Grey Lag (sex not given) from Limerick, Ireland, Nov. 1901 was considered by F. Coburn to belong to this form (*Bull. B.O.C.*, xii, pp. 80-81). The bird is described as being paler, having a distinct white band at the base of the bill (this character is so variable as to be useless) and blacker under-parts and to have a very distinct coloration of the bill and legs (the colour is not described) and a wing of 19¼ inches (*ca.* 490 mm.) the tips of which were an inch short of the end of the tail. *H.F.W.*

**Voice.**—Note higher-pitched and more "laughing" in quality than that of the other grey geese; described by Lord W. Percy as "less nasal . . . more querulous, more highly pitched and more musical, uttered in quicker time and possessing a curious metallic ring—a strangely haunting sound." Most commonly of two syllables, sounding like "kow-yow," "kow-lyow," "yow-yot," "lyō-lyok," "lyō-lyek," etc. (P. Scott). *B.W.T.*

**Display and Posturing.**—Behaviour of breeding birds is essentially the same as in Grey Lag (O. Heinroth). *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds on open tundra with little covert, by preference on islands in rivers; also on tops of grassy tussocks in morass and shows tendency to nest gregariously. *Nest.*—In hollow of peaty soil; composed of stalks of heather, lichens, grasses, moss, etc., mixed with down and feathers; work of female alone (observed in confinement). Down, pale grey. Feathers rather large: some white, some black, others blackish and pale grey: can only be confused with those of next form, but are larger (see Plate 77A). *Eggs.*—Usually 4 in Siberia, but 6 recorded and 4 to 7 in Canada and Alaska; creamy-white, but often nest-stained. Average of 34 eggs (23 by H. Goebel) 78·96×51·8. Max.: 88·5×56·5 and 85×57. Min.: 75·5×52 and 81×49·4 mm. Average weight of 20 eggs, 10·98 grams (12·48–9·96 gr., Goebel). *Breeding-season.*—Apparently from mid-June in Siberia; but in Alaska from last days of May onward. *Incubation.*—Begins on completion of clutch; eggs (in confinement) laid on consecutive days (J. C. Laidlay); brooded by female alone, male on guard close at hand. Period 27–28 days (Laidlay). *Fledging.*—Young tended by both parents. Single-brooded. *F.C.R.J.*

**Food.**—Little on record from breeding grounds; young eat shoots of *Equisetum.* In winter-quarters and on migration, largely grasses from marshes: *Plantago maritima, P. subulata, Triglochin maritima, Statice maritima, Glyceria distans* specified by Naumann. Also *Trifolium repens*, remains of large beetles, and probably at times grain and green shoots of reed, etc. *F.C.R.J.*

**Distribution.**—*British Isles.*—Winter-visitor (early Oct. and Nov. to Feb. and Mar. often some staying to April and even end May). Main haunts now Islay and Tiree (I. Hebrides), S. Uist (O. Hebrides), R. Severn and Ireland (in great bogs of all provinces and Wexford Slob). Also locally in some numbers Norfolk, Northamptonshire, Solway and parts of S. Wales, and in smaller numbers regularly in other parts such as Lincs, Suffolk, R. Ouse valley, Westmorland, Lancs, Cheshire, N. Wales, Anglesey, Somerset and Aberdeenshire. Small numbers also regular winter Benbecula and N. Uist, and extensive passage, chiefly autumn, through O. Hebrides; regular Kintyre (Argyll) passage-migrant but also winter; in Tay regular passage-migrant sometimes in large numbers. In many other parts Great Britain occurs irregularly, usually in small flocks, but occasionally in fairly large ones. *H.F.W.*

**Distribution Abroad.**—N. Holarctic region. Typical form breeds in Europe only in N.E. Russia, east from Kanin peninsula, Kolguev and Novaya Zemlya (not in Lapland); also in Siberia to Taimyr, and thence eastward to the Tchukchi peninsula and arctic N. America. In Greenland only breeds on W. side and in arctic Canada and Alaska breeding grounds of *A. a. gambelli* are at present unknown. In Old World migrates south to France, Switzerland, Germany, S. Italy, Sicily, Greece, Asia Minor, Cyprus, Syria, Egypt, Iraq, Persia, Afghanistan, N. India, China, Burma and Japan. American birds winter south to central Mexico, Texas, Louisiana and Cuba, but only certainly known winter resort of *gambelli* is California. Casual Færoes, N. Spain, Mallorca, Malta and Madeira; on passage Iceland. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—(*Upper-parts*) fore-head and broad band at lateral base of bill white, bordered behind by black or brown-black band, merging into dark ash-brown of crown; nape and upper-mantle dark ash-brown, in some tinged rich buff-brown; rest of mantle and scapulars very dark ash-brown edged lighter brown, fading at tip to brownish-white, some feathers of mantle with dark grey bloom; lower scapulars dark sepia; back and rump dark sepia, feathers in some with dark grey bloom, edged at tip with lighter brown, those bordering upper tail-coverts in some more or less tipped white; sides of back and rump white; upper tail-coverts white, sometimes some with central ash-brown streaks; (*sides of head* and *under-parts*) feathers on intercrural space usually more or less white (white sometimes absent), bordered behind in some by black or black-brown, sometimes with two parallel blackish streaks extending on to chin; small white patch in some under eye; sides of face and rest of neck ash-brown; upper-breast pale ash-brown, feathers fringed buffish-white; sides of body and flanks as mantle, but sometimes intermixed with black feathers, outer feathers edged white on outer web; thighs ash-brown; rest of breast, belly and vent greyish-white or pale ash-brown, more or less mixed with irregular spots and patches of black, isolated or more or less confluent, and sometimes breast and belly very heavily marked black; vent and under tail-coverts white; axillaries and under wing-coverts dark ash-brown; *tail-feathers* sepia tipped white, outer webs and in some inner narrowly bordered white, outer feathers sometimes with inner webs more or less white; *primaries* brown-black with white shafts (brown towards tip), outer primaries with grey bloom on basal two-thirds; *secondaries* brown-black, outer webs and tips usually narrowly bordered white, innermost and their coverts with outer webs as mantle and faintly edged white; *primary-coverts* and *bastard-wing* dark ash-grey; *greater coverts* sepia with dark grey bloom and tipped white; *lower median coverts* as mantle; *lesser* and *rest of median wing-coverts* and *lesser* and *median primary-coverts* ash-brown with dark grey bloom and lighter brown tips. This plumage is acquired by complete moult July to Jan.; remiges are shed together in July, body and tail moult usually commencing in earnest later. SUMMER.—There appears to be a partial moult Feb. and March, involving feathers of head, neck and scattered body-feathers, sometimes an odd tail-feather but possibly such birds may be completing a delayed winter-moult. Coloration as winter, but edges of feathers of upper-parts more or less worn off.

NESTLING.—Down on crown, centre of nape, rest of upper-parts, and sides of body sepia, paler on nape; yellowish-white bar across wing; fore-head, rest of neck, sides of face, chin and throat ashy-white tinged buff-yellow; sepia streak from lores to eye; remaining under-parts greyish-white, in some with yellowish tinge.[1]

JUVENILE.—Like adult, but (*upper-parts*) no white on fore-head or at base of bill, in some band at base of bill black or black-brown; mantle and scapulars as in adult, but with less dark grey bloom, being uniform sepia with lighter brown edges ; central upper tail-coverts in some with ash-brown central streaks ; (*under-parts*) feathers of sides of body and flanks paler than in adult, being uniform ash-brown, feathers with buffish-white or brownish-white tips, some flank-feathers with outer webs edged whitish-buff ; chin sometimes white ; upper-breast as in adult, but rest of breast and belly pale ashy-white without any black markings, but sometimes some spots or frecklings of dark grey giving a speckled appearance ; lower-belly and vent white ; *tail* and *wing* as in adult. (*Shape of feathers*) those of sides and front of neck normal without pointed tips of adult, those of mantle, scapulars and under-parts narrower and more rounded at tip ; tail-feathers, secondaries, greater and median coverts narrower than in adult, tail-feathers more pointed and wing-coverts more rounded at tip.

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[1] Description from nestlings in E. L. Schiöler's collection. Specimens in Brit. Mus. (Alaska) differ in having a yellowish-white patch more or less indicated below wing, while fore-head, rest of neck, sides of face, and under-parts are yellow. [A.C.M.] Yellow of under-parts varies from pale yellow to buffish or creamy-yellow. *H.F.W.*

FIRST WINTER AND SUMMER.—Like adult, but (*upper-parts*) usually with less white on fore-head and at base of bill (in some with quite as much white as in adult), white often more or less intermixed with black feathers, in some with little if any white at lateral base of upper mandible which is more or less black ; (*under-parts*) chin more or less black, sometimes with white patch ; usually no black markings on under-parts, but in some a few black feathers and feathers of breast and belly often more or less mottled or spotted with dark grey giving a speckled appearance, in some with dark grey centres ; new *tail-feathers* as in adult ; *wing* as in juvenile, but worn and abraded. The juvenile body-feathers (back and rump always ?), some tail-feathers, in some central pair only, occasionally innermost secondaries but not rest of wings are moulted from Sept. onwards. Usually many juvenile body-feathers are retained and under-parts and tail are often not moulted.

SECOND WINTER AND SUMMER.—Not to be distinguished with certainty from adults.

MEASUREMENTS AND STRUCTURE.—♂ wing 392–442 mm., tail 114–132, tarsus 60–71, bill from feathers 43–52 (12 measured). ♀ wing 380–421, bill 43–47. (Extreme measurements both sexes, European birds : wing 369–450, tarsus 55–80, bill 40–55, nail 8–15. H.F.W.) Primaries : 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd and 4th 4–11 mm. shorter, 5th 28–42 shorter, 6th 62–73 shorter. Tail with 16, sometimes 18, feathers. Bill shorter than head, otherwise as in Grey Lag-Goose : teeth 22–29 (J. Berry). Loral, and to lesser extent frontal, feathering on bill with a more curved outline than in Grey Lag-Goose, loral feathering apparently extending farther on bill. Weight 6 to 4 lbs., average of 21 5 lbs. 3 ozs. (H. L. Popham). Other structure as in Grey Lag-Goose.

SOFT PARTS.—Bill (ad.) pale pink to rich rose-red with longitudinal median streak of yellow on culmen and along rami of lower mandible (bill sometimes orange-yellow) ; nail white ; (juv. and 1st winter) greyish-yellow, nail dark (J. Berry) ; legs and feet (ad.) orange with paler membranes, sometimes reddish flesh-coloured, claws whitish ; (juv. and 1st winter) claws dark (P. Scott) ; iris dark hazel ; eyelids greyish sometimes with yellowish shade or brownish-grey but never lemon-yellow or orange as in *A. erythropus*.

[*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—For distinctions of Lesser White-fronted Goose see under that species. Whitish instead of black nail and black breast-feathers distinguish adult (for juveniles see descriptions) from Pink-footed and Bean-Geese ; darker plumage and orange legs from Grey Lag. Largest individuals of *A. a. gambelli* (? central Arctic Canada) appear to have longer wings and bills than largest European (max. : European, wing 450 mm., bill 55, American, wing 475, bill 62) and some American are blacker on under-parts, but the two forms appear to overlap considerably, and until more birds of the type of *gambelli* have been discovered and collected on the breeding grounds, the exact differences of the two forms must remain uncertain.[1] *H.F.W.*

*PLATES 77a and 78.*

## 305. THE LESSER WHITE-FRONTED GOOSE—Anser erythropus (L.)[2]

ANAS ERYTHROPUS Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—" Habitat in Europa septentrionali ").
*A. erythropus*, Yarrell, iv, p. 263 (in text); Saunders, p. 400 (in text); *id.*, Brit. B., i, p. 14.
*Anser finmarchicus* Gunner, Hand-List (1912), p. 129.
*Anser erythropus* (L.), Pract. Handb., ii, p. 240.

**Habitat.**—In breeding-season is primarily a fell-haunting species, frequenting swamps and peat-mosses or vicinity of streams fringed by birch and willow-scrub from about 250–700 ft. in the Varanger Peninsula (H. M. S. Blair) and to over 1,000 ft. in Swedish Lapland, but ranging to within 100 ft. of sea-level in the Varanger district in backward seasons when snow lies late on the fells. Outside breeding-season, as White-fronted Goose. *B.W.T.*

**Field-characters and General Habits.**—By no means merely a small edition of White-fronted Goose, adults being quite distinct-looking by reason of *considerably greater extent of white front, which reaches on to top of head between eyes, shorter, smaller bill and swollen lemon-yellow ring round eye.* In White-fronted Goose white rarely if ever extends beyond level of front of eye and seldom reaches even so far, while eyelids are brownish and not swollen. Lesser White-fronted is also distinctly darker and closed wings project beyond tail, which is not the case in the other species. It is also decidedly smaller than average *albifrons*, but as there is an overlap with smallest examples of that species size alone is not diagnostic. Black barring of breast as in White-fronted Goose and equally variable, and colour of bill and legs similar.

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[1] The only specimens from the probable breeding area of *A. a. gambelli* appear to be a head and skin in the British Mus. The head is of a female taken with 6 young in down on the arctic coast of Fort Anderson (near Franklin Bay) July 6, 1865, and measures: bill from feathers, 59 mm., depth at base 33, nail 16. The skin (not sexed) is from Repulse Bay (head of Hudson Bay) collected by John Rae (no date but probably June 1, 1847, *fide* N. B. Kinnear) and has following measurements: wing 440 mm., bill 62, depth 32, nail 14·5, tail 130, tarsus 75. In winter-quarters these large birds are now stated to occur only in California, but it must be noted that Texas is the locality given by Hartlaub for his *gambelli*, so that the applicability of this name, which is generally used, is not certain, and in any case these birds cannot be expected to occur in Europe. The late F. Coburn wrote at length (*Zool.*, 1902, pp. 337–351) on a number of White-fronted Geese collected in W. Ireland, which he considered distinct from the typical form and assigned to "*A. gambeli.*" With reference to these Irish birds Mr. Peter Scott writes to me that they may eventually be proved to belong to a distinct race as " White-fronted Geese from the breeding-ground in W. Greenland appear to be darker in plumage and to have orange-yellow bills, while many of those wintering in Ireland are said to have these characteristics and may belong to the same race, which may also occur in other parts of the Brit. Is." *H.F.W.*

[2] Further research may show that the breeding-ranges of this bird and the White-fronted Goose do not overlap, in which case they may perhaps be treated as forms of one species.

Though white front is absent in young birds these already have the yellow eyelids. Total length *c.* 21–26 ins.; body *c.* 16–17 ins.

Habits as other grey geese and like them occurs in huge flocks in its regular winter-quarters. Recorded by Zhitnikov passing night on water amongst flooded reeds or on river bank as well as on open steppe, but roosting habits probably do not differ from those of other species. A huge flock of not less than 50,000 studied by P. Scott in same region (S. Caspian) roosted on mud-flats of a great lagoon. *B.W.T.*

**Voice.**—Call very noticeably higher and more squeaky than that of White-fronted Goose, so that it is quite easy to detect a single bird flying amongst a flock of *albifrons*. Ordinarily di- or trisyllabic, sounding like "kü-yü" or "kü-yü-yü." The dominant note of a large flock is a sixth higher in the musical scale, and double call of gander looking for its mate is astoundingly thin and so high that it does not sound loud to human ear (P. Scott). According to E. Christoleit high-pitched "i" sound in note is most pronounced when birds are most excited. He also distinguishes a "note of least excitement" (contact-note) described as a single rather strong "kah" very different from notes of other grey geese, with rather weaker version sometimes repeated in rolling sequences or otherwise modulated. *B.W.T.*

**Breeding.**—In Scandinavia and also Siberia breeds normally at greater altitude than other geese, sometimes on hummocks where snow has already melted above snow-line; also in willow and dwarf birch thickets, but may be driven to low ground by deep snow on fells. *Nest.*—Mere hollow in ground, generally on slight elevation; grasses, moss, bits of heaths, willow, etc., mixed with down and feathers. Down brownish-grey, indistinct light centres. Feathers exactly like those of *A. albifrons* but considerably smaller: greyish-white, black and blackish and grey. (See Plate 77A.) *Eggs.*—Usually, 4–5, 3 minimum and 6 occasional; 7 recorded in confinement, often elongated or oval, yellowish-white with rather glossy smooth shell. Average of 72 eggs (27 by E. Rey), 76·48×48·87. Max.: 84·5×50·5 and 76×52. Min.: 69×43 mm. Average weight, 7·36 grams (8·5 to 6·2 gr., Rey). *Breeding-season.*—Usually early June onward in Lapland, exceptionally end of May. *Incubation.*—Begins with penultimate egg (in confinement); by female only, male keeping guard. Period (in confinement), 25 to about 28 days. *Fledging.* — Young tended by both parents; completely feathered at 5 weeks (in confinement, F. E. Blaauw). Single-brooded. *F.C.R.J.*

**Food.**—Probably very similar to that of allied species; largely grasses and other vegetable matter in summer, but no definite records; grain also taken in autumn in winter-quarters. *F.C.R.J.*

**Distribution.**—*England.*—Very rare vagrant. Young male Fenham Flats (Northumberland) Sept. 16, 1886 (A. Chapman, *Field*, Dec. 11, 1886, p. 87; Saunders, p. 400). [Adult female, Wash (Norfolk), Jan. 24, 1900 (F. Coburn, *Zool.*, 1901, p. 317; J. H. Gurney, *Ibis*, 1902, pp. 269–75), one said to have been taken near York (*Birds Yorks.*, p. 413) and one in Humber District about 1874 (J. Cordeaux, *List Birds Humber District*, p. 22), and some possibly on Solway, Jan., 1894 (H. S. Gladstone, *Birds Dumfries*, p. 243), but the histories of these specimens are not above reproach.] *H.F.W.*

**Distribution Abroad.**—N. Palæarctic region. Breeds in N. Norway to 70° N., Sweden (south to Jamtland), N. Finland south to 68° and N. Russia. Also N. Siberia from R. Ob to Taimyr and R. Kolyma (rare), but breeding range south of White-fronted and Bean-Geese. In winter in Europe to France, Germany, Czecho-Slovakia, Hungary, Yugo-Slavia, Greece and S. Russia; also Asia Minor, Iraq, Persia, Aralo-Caspian region, Turkestan, India, China and Japan. Accidental in Spain, Holland, Belgium, Switzerland, Italy, Egypt; also Novaya Zemlya. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—Like White-fronted Goose, but white band on fore-head extends farther backwards on to crown usually to above centre of eye, in some to beyond posterior corner of eye; in some only a white spot at tip of feathering on lower mandible, in others this white as extensive as in White-fronted Goose. Rest of plumage as in White-fronted Goose, but head and neck darker, and mantle and scapulars rather richer chocolate-brown. SUMMER.—No moult apparent. Coloration as winter.

NESTLING.—As White-fronted Goose but fore-head and nape as crown; upper-parts appear darker, light patch below wing merely indicated; lores sepia; sides of face yellow suffused sepia; under-parts yellow, fore-neck suffused dusky. (One specimen 3.7.01 E. Finmark, in coll. N. F. Ticehurst compared with nestling White-fronted Goose in Brit. Mus.) Another specimen (hatched in captivity) has down of fore-head and nape tipped yellow, upper-parts a shade darker than White-fronted, yellow spot below wings clear, under-parts yellow as some White-fronted (H.F.W.).

JUVENILE.—Coloration as in White-fronted Goose but fore-head, crown and centre of nape appear darker. No white on chin in few specimens examined. Distinguished from adult by same characters which distinguish White-fronted Goose from adults.

FIRST WINTER AND SUMMER.—As adult but with black on breast and belly confined to a feather or two, one March specimen (no sex) has white band on fore-head as extensive as in adult, feathers on intercrural space white, one ♀ Yenisei, June, has white on fore-head and at base of bill less developed and no white on intercrural space. Most juvenile body-feathers, some tail-feathers, some innermost secondaries and median coverts are moulted in winter and spring (only two specimens examined).

MEASUREMENTS AND STRUCTURE.—♂ wing 367–388 mm., tail 95–109, tarsus 58–62, bill from feathers 28–35 (9 measured). ♀ wing 352–381, bill 32–35 (4 measured). (Extreme measurements both sexes: wing 340–390, bill 30–45, J. Berry). Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd and 4th 5–10 mm. shorter, 5th 28–35 shorter, 6th 56–67 shorter. Folded wings usually overlap tips of tail-feathers, while in White-fronted Goose they seldom do so. Tail-feathers 16. Bill considerably shorter and comparatively thicker at base than in White-fronted Goose, tomia of upper mandible very slightly curved and completely covering teeth when bill is shut; teeth 20–22. Weight 4½ lbs. (H. L. Popham). Other structure as in White-fronted Goose.

SOFT PARTS.—Bill (ad.) light rose-red to rosy flesh-colour, sometimes orange-red, nail white, (juv.) dingy pink-grey; legs and feet (ad.) orange-yellow with paler webs, (juv.) pale dingy yellow; iris dark chestnut; eyelids orange-yellow or lemon-yellow and perceptibly swollen. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Distinguished from White-fronted Goose by smaller size, by "teeth" being concealed when bill is shut, by swollen eye-lids and in adults by white on fore-head extending farther back on to crown. *H.F.W.*

*PLATES 77a and 78a.*

## 306. THE BEAN-GOOSE—Anser fabalis fabalis (Lath.)[1]

Anas Fabalis Latham, Gen. Syn., Suppl., i, p. 297 (1787—Great Britain).
*Anas segetum* Gmelin, Syst. Nat., i, 2, p. 512 (1789—ex Latham, England).
? *Anser rufescens* Brehm, Beitr. z. Vögelk., iii, p. 871 (1822—High north, probably Iceland, Germany in winter 1808).
*Anser platyuros* Brehm, Handb. Naturg. Vög. Deutschl., p. 837 (1831—High north, winter Pomeranian coast, very rare central Germany).
*Anser arvensis* Brehm, Handb. Naturg. Vög. Deutschl., p. 839 (1831—High north, winter commonly Germany).
*Anas paludosus* Strickland, Rep. Brit. Ass. Adv. Sc., 1858, pp. 131, 132; Ann. and Mag. Nat. Hist., 1859, pp. 122–24, pl. iv, Fig. 1 (England).
*Anser segetum* (Gmelin), Yarrell, iv, p. 265; Saunders, p. 401.
*Anser fabalis fabalis* Latham, Pract. Handb., ii, p. 242.

**Habitat.**—In breeding-season frequents both open tundra with scattered lochs or traversed by wide rivers and estuaries, and swamps or swamp lochs in forested country. In winter much as Grey Lag, but in Scotland fond of hill lochs and dry pastures, roosting on fresh water, though it has been stated that this is characteristic of yellow-billed form and that the other is found more near sea, roosting on coastal sand-banks (see under "Field-characters"). Appears seldom, if ever, to feed on stubble in British Is., though it does so regularly on parts of Continent (*e.g.* Russia, Hungary: P. Scott). *B.W.T.*

**Field-characters and General Habits.**—Bean-Goose is brownest of the grey geese, and often conspicuously dark, though this is not the case with all and some White-fronted Geese are as dark. Typically it is much darker than Grey Lag, and even amongst the other species can often be picked out when not close enough to see details by distinctly darker, more sooty appearance. Head and neck not darker than back, but usually distinctly contrasted with paler chest, though less so than in conspicuously dark-headed Pink-foot; fore-wing as dark as rest. Light edges to feathers are often prominent, tending to give more "patterned" effect than in the other species. General appearance is rather long and slim, with noticeably long neck. *Legs are orange or orange-yellow.* Bill is longer and stouter than in Pink-foot and coloured *orange-yellow and black.* Two extreme types occur, one with bill mainly black with orange-yellow band towards tip ("*Anser segetum*"), the other ("*Anser fabalis*" or "*arvensis*") with bill mainly orange-yellow, sometimes almost completely so except for black nail, but usually with some black on culmen, at extreme base of upper mandible and sometimes along its cutting edge, and on basal part of lower mandible. The yellow-billed type is considerably the more frequent in Brit. Is. Though intermediate bill patterns occur various authors since Naumann have maintained that the two forms represent distinct species or races and that the yellow-billed type has a relatively broader, stronger and longer bill, while according to J. Berry it is also a squatter and plumper bird with a relatively shorter neck and more rounded head and even tends to occupy a distinct habitat in winter (see above). But this view is not accepted here. Some birds have narrow, but distinct white band at base of bill. No black markings on under-parts. Size varies from that of Grey Lag to Pink-foot. Total length *c.* 28–35 ins.; body *c.* 18–20 ins.

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[1] It must be pointed out that Latham's description, which is taken from Pennant, *Brit. Zool.*, ii, No. 267, fits the Pink-footed Goose rather better than the Bean-Goose. It was not, however, until many years afterwards that it was realized that there were two kinds of "Bean" Geese, and the name *fabalis* had better be retained for the bird we now call the Bean-Goose. Gmelin's *segetum* is an absolute synonym of Latham's *fabalis*. Brehm's names quoted above appear to refer to slightly differing individuals of the Bean-Goose, though *rufescens* is doubtfully this or a Pink-foot, while Strickland's Carr Lag or Long-billed Goose, *Anas paludosus*, with its long, weak bill of 2¾ ins. and 1⅜ ins. deep at the base, is clearly what we now call the Bean, though what he called the true "Bean Goose, *A. segetum*," with a short, strong and deep bill (1⅞ ins. long, 1⅛ ins. deep at base) seems equally clearly our Pink-footed Goose. *H.F.W.*

General habits do not differ from those of other grey geese, but more prone to roost inland, often remaining to sleep on marshes at night, even when associating with other species which retire to coast to roost. See, however, under " Habitat." *B.W.T.*

**Voice.**—The least vocal of British grey geese. Note is usually very gruff and according to some much like Grey Lag's, but P. Scott finds it very like low note of Pink-foot, but more " reedy," like a bassoon or slightly reminiscent of baaing of sheep; usually disyllabic. *B.W.T.*

**Display and Posturing.**—Sexual behaviour essentially as Grey Lag's (O. Heinroth). *F.C.R.J. & B.W.T.*

**Breeding.**—In Scandinavia and N. Finland often breeds among scattered trees (birches or pines), but always within a few hundred yards of water, sometimes on islets in rivers in woods. Much breeding ground is, however, beyond tree-limit. *Nest.*—Usual scrape on ground, sometimes partly sheltered by dwarf willows, etc., composed of grasses, dead leaves, mosses and lichens mixed with down, etc., and made by female. Down brownish-grey, centres paler. Feathers greyish-brown, among the darkest of goose-feathers (G. H. Lings). (See Plate 77A.) *Eggs.*—Usually 4 or 5 to 6, but 3 only and 7 on record; white when fresh but much stained as incubation advances; broad ovate as a rule, with coarse grain. Average of 37 authentic eggs, 83·83×55·26. Max.: 93·3×55·2 and 84×57·3. Min.: 74·5×53·3 and 79×52·7 mm. (E. Wasenius gives average of 25 as 83·76×56·2 mm., and weight 14·45 to 10·75 grams). *Breeding-season.*—From early June in Scandinavia to latter part of June and early July in high north. *Incubation.*—Begins when clutch is complete or nearly so: by female alone; male on guard close at hand. Period (in confinement) 27–29 days. *Fledging.*—Young tended by both parents. Period? Single-brooded. *F.C.R.J.*

**Food.**—In breeding-season grasses and water-plants; *Eriophorum* (cotton-grass), *Equisetum palustre* and lichens recorded. On migration and in winter grass, clover and leaves of young corn as well as many other plants, but it is not nearly so partial to grain as other species and probably its name is due to confusion with the Pink-foot. Recorded as eating fruit of dog-rose (*Rosa canina*) in Scotland and water-cress in Ireland. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Winter-visitor (early Oct.-Nov., sometimes Sept. to March and April, occasionally May, exceptionally June). Chief haunts Northumberland, Norfolk (local), Suffolk, Ayr and one locality S.W. Scotland. Small numbers Wash, Sussex, N. Uist and Aberdeenshire. In Tay and Berwick chiefly as passage-migrant. In S. and W. England

and Wales and Forth area occurs as an irregular and scarce winter-visitor and in N. Scotland and islands (except N. Uist) is rare or unknown. *Ireland.*—Very scarce south but less uncommon west and midlands, especially in severe winters. *H.F.W.*

**Distribution Abroad.**—A N. Palæarctic species. Typical race breeds in N. Norway (70° to 61°), N. Sweden, N. Finland, N. Russia, Kolguev and Novaya Zemlya; also in N. Siberia east to the Taimyr. In south to 63° in Scandinavia and at least 64° on the Yenisei. Replaced in Iceland, Spitsbergen and E. Greenland by *A. f. brachyrhynchus* and in N.E. Siberia from the R. Lena to Tchutchki peninsula by *A. f. serrirostris* and in the wooded regions of E. Siberia from the Altai to Mongolia and Kamtschatka, by *A. f. middendorfi*. Typical race passes through Europe to winter in Mediterranean (rarely N. Africa), Black and Caspian Seas; also Asia Minor, Palestine, Persia to Turkestan. Eastern races winter in N. China and Japan. Casual in Madeira and Egypt. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—(*Upper-parts*) fore-head and crown dark ash-brown, feathers with black-brown bases; in some a small white patch on fore-head, in some merely a few white feathers; nape buff-brown; upper-mantle ash-brown, feathers tipped buff-brown; mantle and scapulars very dark ash-brown with lighter brown edges shading to brownish-white at tip, in some feathers with grey bloom; back, rump and some upper tail-coverts black-brown, feathers edged sepia (upper tail-coverts sometimes more or less tipped white); sides of back and rump, and rest of upper tail-coverts white (central upper tail-coverts sometimes suffused dark grey); (*sides of head* and *under-parts*) lores and cheeks dark ash-brown, lores in some black-brown; chin, throat, rest of neck and upper-breast dark ash-brown, feathers of upper-breast with broad light buff tips (chin in some with white spot); feathers of sides of body and flanks as mantle, but more broadly tipped whitish, some flank-feathers narrowly bordered white on outer web and tipped same; thighs ash-brown, feathers with light buff tips; rest of breast and part of belly very pale ash-brown, feathers shading to white or buff-white at tip (in fresh plumage feathers of breast and belly with faint terminal dusky-brown lines); lower-belly, vent and under tail-coverts white; axillaries and under wing-coverts ash-grey to ash-brown; *tail-feathers* dark ash-brown, tipped and narrowly bordered white, outer ones with inner webs paler; *primaries* brown-black with white shafts (brown towards tip), outer primaries usually with grey bloom on basal two-thirds; *secondaries* brown-black, outer webs and tips usually narrowly bordered white, innermost with outer webs more or less dark ash-brown shading to lighter at border and bordered white; *primary-coverts* and *bastard-wing* dark ash-grey; *greater* and lower *median coverts* dark ash-brown broadly tipped white (in some with grey bloom), rest of median coverts same with narrow light brown or whitish tips; *rest of wing-coverts* ash-brown with dark grey bloom and lighter brown tips (in some lesser coverts sepia similarly edged). This plumage is acquired by complete moult from July onwards; moult of remiges usually appears to be almost completed before body and tail moult commences. SUMMER.—There appears to be a partial moult in spring (March and early April) involving feathers of head, neck and odd body-feathers, and occasionally some tail-feathers. Coloration as winter but light edges to feathers of upper-parts abraded.

NESTLING.—Down on crown, centre of nape and upper-parts olive-brown, long filaments of nape and upper-mantle tinged greenish-yellow; indistinct spot below wing, and bar across yellowish; black-brown line from side of upper mandible to eye, eyelids black-brown; region below eye yellowish, more or less suffused olive-brown; sides of body and back of thighs dusky-brown; remaining under-parts whitish-yellow.

JUVENILE.—Like adult, but no indication of white feathers at base of bill; (*upper-parts*) edges to feathers of mantle, scapulars and wing-coverts browner; black-brown upper tail-coverts tipped buff, white upper tail-coverts with brownish shaft-streaks or central markings; (*under-parts*) sides of body and flanks pale ash-brown tipped buff; rest of under-parts as in adult, but sometimes feathers more or less suffused towards centre or narrowly streaked or spotted ash-brown; *tail-feathers* as in adult, but white borders usually much narrower and in some absent; *wing* as in adult, but *secondaries* including innermost, sometimes without white borders or tips. (*Shape of feathers*) those of sides and front of neck normal, without pointed tips as in adult; those of mantle, scapulars and under-parts narrower and more rounded at tip, not broad and square as in adult; tail-feathers, secondaries, greater and median coverts narrower, tail-feathers more pointed and wing-coverts more rounded at tip.

FIRST WINTER AND SUMMER.—As adult and only to be distinguished by more worn appearance of juvenile *wing*, especially narrower and more worn *greater* and *median coverts*. The juvenile body-feathers (back ?, some feathers of rump), some tail-feathers, sometimes some innermost secondaries and coverts and some median coverts are moulted Oct. to April.

SECOND WINTER AND SUMMER.—As adult winter.

MEASUREMENTS AND STRUCTURE.—♂ wing 447–498 mm., tail 117–145, tarsus 71–87, bill from feathers 56–66, depth of bill at base of both mandibles 30–38, greatest visible depth of lower mandible with bill shut 7–9 (15 measured). ♀ wing 424–452, bill 51–60 (wing ♂ 404–482, ♀ 402–460, bill ♂ 51–67, ♀ 51·8–60 (? sex 50–69·5), depth of lower mandible ♂ 5·5–9·5 (one 11), ♀ 5·5–8·5, G. Dementiev). Primaries: 1st narrow, pointed and slightly more than half longest primary-covert, 3rd longest, 2nd 10–16 mm. shorter, 4th 7–10 shorter, 5th 33–40 shorter, 6th 65–72 shorter. Tail with 18 feathers. Bill as in *A. anser*, but not so stout, narrower towards tip viewed from above, of less depth throughout viewed laterally, nail varying from oval to nearly round. Outline of frontal and loral feathering as in *A. a. albifrons* but less accentuated. Teeth 24–28. Weight 8½–4¾ lbs., average of 66, 6½ lbs. (H. L. Popham), one 9½ lbs. (C. Dalgety).

SOFT PARTS.—Bill (ad.) variable, in some black with orange or yellow band round both mandibles just behind nail, in some as above, but band extending on upper mandible backward under nares and along tomium almost to gape, in some upper mandible entirely yellow, nail variable, black, but in some partly pale horn, lower mandible orange-pink with rami black at base (usual type of British birds has considerable amount of yellow); bill (juv.) blackish with band of yellow behind nail or in some yellow except for blackish patch at sides, blackish mark on top of culmen and area round nostrils, nail black streaked yellow, anterior half of under mandible including intercrural space yellow, rest black; legs and feet (ad.) yellow-orange of varying intensity, claws dark horn-colour to white; legs and feet (juv.) dingy yellow or greyish-yellow; iris brown.

[*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Ash or dark ash-brown wing-coverts, tipped brownish-white, black nail and size distinguish Bean- and Pink-footed from other British grey geese. For differences of Pink-footed Goose see under that form. *A. f. serrirostris* (N. E. Siberia, lower Lena to Anadir) is larger and lower mandible is much more pronouncedly curved (wing 422–524 mm., bill 58·5–71·5, height of lower mandible 8–12·5. G. Dementiev) but it intergrades with typical form. *A. f. middendorfi* (=*sibiricus*) (wooded zone of E. Siberia) is similar in size to *serrirostris* but lower mandible (height 7–10·5) is less curved (Dementiev). Many other forms have been described chiefly from migrants and are very doubtfully separable.[1] *A. neglectus*[2] has a slender pink bill and pink feet and may be a fairly frequent individual variation or localized in a breeding area not yet discovered, while *A. carneirostris* seems a similar variation. *H.F.W.*

*PLATES 77a and 78a.*

## 307. THE PINK-FOOTED GOOSE—Anser fabalis brachyrhynchus[3] Baillon

Anser brachyrhynchus Baillon, Mém. Soc. R. Abbeville, 1833, p. 74 (France).
*Anser phœnicopus* Bartlett, Proc. Zool. Soc. London, Part vii, p. 3 (1839—England).
*Anser brachyrhynchus* Baillon, Yarrell, iv, p. 270 ; Saunders, p. 403 ; Pract. Handb., II, p. 245.

**Habitat.**—In breeding-season frequents tundra and grassy plains or river valleys of arctic, chiefly near river gorges, cliffs or rocky outcrops, which provide favourite breeding-sites. Outside breeding-season frequents similar ground to Grey Lag, though seldom actually the same, and is fond of stubble-, young corn- and potato-fields, resorting to fields on hills, *e.g.* Wolds of Yorkshire, as well as to low ground. *B.W.T.*

**Field-characters and General Habits.**—Smaller than Grey Lag, characterized by *contrast of dark head and neck with rather pale body, small delicately shaped beak, black with pink band, and pink legs.* Exceptionally bill may be wholly pink. In flight fore-wing is noticeably pale greyish, though not so pale as in Grey Lag. Winter plumage distinctly greyer than summer one, which is browner. No black markings on under-parts. Young birds lack buff edges to feathers of upper-parts and look darker, while underside has marbled appearance, not uniform grey as in adults. Legs are a dirty greyish-pink or sometimes yellowish at first, then very pale pink quite different from adults'. Total length *c.* 24–30 ins. ; body 17–19 ins.

Habits as other grey geese. Often in very large flocks. Chiefly roosts on sandbanks of coasts and estuaries, but will do so on marshes where not disturbed (B. B. Rivière). *B.W.T.*

**Voice.**—General effect of notes is not so deep as Grey Lag's or so high-pitched as White-front's, lacking also the "laughing" quality of latter. Individual calls resemble syllables "ung-unk" or half-way between this and "ang-ank." There are two pitches, one more than an octave higher than the other and evidently the gander's ; sometimes "wink-wink." Note is usually di-, sometimes trisyllabic. Alarm-note is single very high-pitched, short squeak, and there is a low conversational tone not at all unlike drumming of snipe (P. Scott). Has also the usual hiss of anger. *B.W.T.*

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[1] Some writers have considered that two forms ("*segetum*" and "*fabalis*" or "*arvensis*") occur in the Brit. Is., but the differences (especially size and colour of bill and relative size of nail) are very variable in individuals and do not seem constant or reliable as racial characteristics. They come within the range of the typical form as defined by G. Dementiev in his careful study of birds from their *breeding quarters*, which, as he very truly states, is the only way of arriving at correct results (*cf. Alauda*, 1936, pp. 169–193) and further work on the breeding-grounds may result in other forms being clearly differentiated. *H.F.W.*

[2] Two birds somewhat of this type from the Tay, Scotland, have been described (J. Berry, *Ibis*, 1934, pp. 80–85).

[3] Judged both on form and breeding distribution the Pink-footed and Bean-Geese are clearly geographical races of one species.

**Display and Posturing.**—Sexual behaviour essentially as Grey Lag (O. Heinroth). *F.C.R.J. & B.W.T.*

**Breeding.**—In Spitsbergen, Iceland and Greenland breeds usually on top of talus, on ledges and terraces on face of cliffs or on rocky sides of valleys, as some protection against arctic fox; also on islands in rivers or shingle beds occasionally, but some nests are placed on open tundra. Generally breeds in colonies. *Nest.*—Hollow in earth, evidently used year after year in some cases, thickly lined with mass of grasses, lichens, mosses and arctic plants, mixed with much down and some earth. Down brownish-grey, some with lighter centres. Feathers rather small, grey, tipped lighter, giving a somewhat silvery appearance (G. H. Lings). (See Plate 77A.) *Eggs.*—Usually 4–5 but larger numbers from 7–8 on record; 9 due to two females. Incubated sets of 1–3 may be due to accidents or old age. Shape variable, usually ovoid; colour dull white, rather coarse grain. Average size of 292 Spitsbergen eggs, 78·29×52·35 (O. Le Roi); 50 eggs by writer 79·09×52·94. Max.: 95·7×52 and 82·6×58·3. Min.: 69×51 and 77×47·4 mm. Average weight 11·65 grams (8·11 to 16·24 gr., Le Roi). 37 Icelandic eggs are slightly larger, 81·6×53·4 mm. (W. M. Congreve). *Breeding-season.*—Usually about mid-June, but some lay early June in Spitsbergen. *Incubation.*—Begins on completion of clutch; eggs laid daily (in confinement); by female alone, male standing on guard close at hand. Period 25–26 to 28 days (in confinement). *Fledging.*—Young tended by both parents; very active, leaving nest when dry and making their way down to water. Feathers begin to show 28th day; at 58 days fully fledged (C. Smith). Single-brooded. *F.C.R.J.*

**Food.**—On breeding-grounds feeds on buds, stalks, leaves, seeds or roots of arctic plants: *Cerastium edmonstonii, Saxifraga, Equisetum arvense, E. alpestre, Cochlearia*, and grasses where available. Young contained leaves and buds of *Salix reticulata* (O. Le Roi). In winter and on migration they resort to stubbles, preferably for barley, but also oats and sometimes wheat; also young self-sown corn and young rye grass. Then later damaged potatoes, finally young wheat and grass in Lincs (G. H. Caton-Haigh). J. Cordeaux thought that white clover and trefoil were principal food on stubbles, but this seems to require confirmation. *F.C.R.J.*

**Distribution.** — *Great Britain.* — Winter-visitor (Sept. (occasionally Aug., exceptionally July) and Oct. to April and early May). Has increased during last 40 to 50 years.[1] Main haunts now in many places on E. side from Dornoch Firth to Norfolk and N. Cambridge (scarce Suffolk), on W. side, R. Severn (Sept. to Dec.), and R. Ribble to Solway, also locally Clyde area, and in small numbers Islay and other I. Hebrides. Elsewhere is scarce and irregular. In N.W. Scotland unknown, on N. coast only passing over, has been noted a few times in Shetlands, Fair Isle and Orkneys as well as O. Hebrides (where some evidence of passage) and twice Is. of Man. Rare vagrant inland counties. *Ireland.*—Twelve records. Donegal, Oct., 1891, Roscommon, Feb., 1908, Wexford, Nov., 1927, Feb., 1929, Dec., 1931, Nov., 1932 (ringed Iceland, 1929), Jan., 1937, Limerick, Jan., 1930, Sligo, Dec., 1931, Louth, Jan., 1932, Down, Nov., 1937 (2), Meath, Jan., 1938.[1] *H.F.W.*

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[1] Although early records are doubtful owing to the great confusion which existed between this and the Bean-Goose (persisting long after the two were differentiated) there can be no doubt that the Pink-footed Goose has increased very considerably in this country. *H.F.W.*

**Distribution Abroad.**—Breeds only in N.E. Greenland, Iceland and Spitsbergen. No proof of nesting in Franz Josef Land, but not improbable. In winter south to France (rare), Belgium, Holland, Germany, and occurs (or on passage) Jan Mayen, Færoes, Bear Is. and Scandinavia. Accidental in Switzerland, Austria, Italy, Czecho-Slovakia, Baltic states, Hungary, Yugo-Slavia, Romania, N.W. and S. Russia; once Massachusetts, U.S.A. *F.C.R.J.*

**Description.** — ADULT MALE AND FEMALE. WINTER. — Like Bean-Goose, but smaller; *lores* apparently never black-brown as in some Bean-Geese; (*upper-parts*) feathers of upper-mantle usually edged rather richer brown; mantle and scapulars lighter, ash-grey rather than ash-brown with light brown edges shading to brownish-white at tip; back and rump dark ash-grey; *lower breast* and *belly* suffused darker ash-brown than in Bean-Goose, feathers edged ashy-white; *tail-feathers* as in Bean-Goose, but lighter usually with grey bloom, lateral feathers with broader white tips; *wing* as in Bean-Goose, but *innermost secondaries* lighter, ash-grey or ash-brown bordered white; *primary* and *greater coverts*, *lower median coverts* and *lesser coverts* lighter, being ash-grey, greater and median tipped white, rest of median as mantle, but more narrowly tipped light brown or brownish-white. This plumage is acquired by complete moult in autumn and winter. SUMMER.—There appears to be a partial moult as in Bean-Goose, involving feathers of head, neck and some body-feathers, and an occasional tail-feather. Specimens dated Jan. and end Feb. were in moult.

NESTLING.—Like nestling Bean-Goose but upper- and under-parts strongly suffused greenish-yellow; crown, centre of nape, sides of body and back of thighs dark sepia, down filaments greenish-yellow; spot below wing and bar across wing, and region below eye greenish-yellow; under-parts whitish suffused greenish-yellow. (Spitsbergen specimen.) [Two others (N. Iceland) are not suffused greenish-yellow on upper-parts, and under-parts are pale buffish-cream not greenish-yellow. H.F.W.]

JUVENILE.—(*Upper-parts*) mantle and scapulars browner than in adult, feathers with narrower light brown edges causing darker appearance than adult; some upper tail-coverts with ash-brown central streaks; (*under-parts*) in some a white patch on intercrural feathering extending on to chin; sides of body and flanks ash-brown, feathers edged light buff or brownish-white, some flank-feathers with outer web bordered buffish-white, feathers of breast and belly with pale ash-brown central markings, streaks or frecklings giving under-parts mottled or streaked appearance; *tail* as in adult, but lateral feathers not so broadly tipped white; *wing* as in adult but in some wing-coverts darker, median coverts browner. (*Shape of feathers*) those of neck without pointed tips as in adult, those of mantle, scapulars and under-parts narrower and more rounded at tip than in adult, tail-feathers, secondaries, greater and median coverts narrower, tail-feathers more pointed and wing-coverts more rounded at tip. Distinguished from juvenile Bean-Goose by smaller size, lighter back, rump and wing-coverts.

FIRST WINTER AND SUMMER.—As adult and apparently only to be distinguished by narrower and more worn juvenile *greater* and *median coverts*. Moult apparently as in Bean-Goose.

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[1] Occasional albinos or partial albinos of this species occur with some regularity in large flocks and may be helpful in tracing movements. *H.F.W.*

MEASUREMENTS AND STRUCTURE.—" ♂ wing 417–490 mm., tarsus 69–83, bill from feathers 41–54 (36 measured). ♀ wing 395–454, bill 37–48 (32 measured), nail 10–16" (R. A. H. Coombes). Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd and 4th 3–12 mm. shorter, 5th 28–40 shorter, 6th 60–74 shorter. Tail with 16 to 18 feathers. Bill shorter than head, comparatively broad and deep at base, tomia curved; teeth 19–26, average 21 (Coombes). Weight 8–4 lbs., average of 692, 6 lbs. (G. H. Caton-Haigh, R. A. H. Coombes, H. L. Popham), some immatures in Sept. 3½–2¼ lbs. (J. Berry). Other structure as in Bean-Goose.

SOFT PARTS.—Bill (ad. and juv.) variable, base of upper mandible, ridge of culmen above nostrils and nail black, with flesh-pink to rose-pink band round both mandibles behind nail and extending backwards on upper mandible under nares and along tomium, sometimes reaching gape and sometimes confined to very narrow streak along tomium (occasionally entirely pink and rarely entirely black. Berry); legs and feet (ad.) flesh-pink to bright pink (sometimes almost purple. Caton-Haigh), (juv.) on first arrival (Sept.) usually pale pink or dull reddish-grey but many are yellow ochre or ochreous-flesh, gradually changing to pink during first winter (Coombes); iris dark brown.

[*A.C.M.* revised by *H.F.W.*]

**Characters.**—For differences from Bean-Goose see description above. Strong short bill with black nail, dark head, paler bluish-grey upper-parts and small size, distinguish it from other British grey geese. *H.F.W.*

*PLATES 77a and 79a.*

## 308. THE SNOW-GOOSE—Anser hyperboreus hyperboreus Pall.[1]

ANSER HYPERBOREUS Pallas, Spicilegia Zool., fasc. vi, p. 25 (1769—N.E. Siberia).
*Chen hyperboreus* (Pallas), Yarrell, iv, p. 275; Saunders, p. 405.
*Anser hyperboreus hyperboreus* Pall., Pract. Handb., ii, p. 247.

**Habitat.**—In breeding-season tundra, swamps and marshy flats or shores and islands of lakes in high north. Outside breeding-season much as grey geese; frequents both grasslands or marshes and fields of sprouting grain or stubble, but is also described as feeding on open shore and mud-flats. *B.W.T.*

**Field-characters and General Habits.**—A *pure white goose* about size of Pink-foot, with *black primaries, red bill with white or whitish nail and black cutting edge, and pinkish-red legs.* The primary-coverts and bases of primaries are grey, showing up in flight as distinct pale area between intense black of primaries and pure white of rest of plumage. Bill rather stout. Not separable in field from Greater Snow-Goose. Immature birds have upper-parts dull brownish-grey with darker centres to feathers of back and wing-coverts, under-parts greyish-white, bill and legs leaden. Total length *c.* 25–28 ins.; body *c.* 17–18 ins.

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[1] The question whether the Blue Goose (*A. cærulescens*) and the Snow-Goose (*A. hyperboreus*) are distinct species, which hybridize in parts of their breeding-range, or dimorphisms of the same species has long been debated. The downy young of the two birds are easily distinguishable and the fact that Mr. J. Dewey Soper found no proof of dimorphism, each brood containing young of only one type, supports the view that they are distinct species (*cf.* J. Dewey Soper, "The Blue Goose," *N.W. Territories and Yukon Branch Dept. Int.*, Ottawa, 1930, and G. M. Sutton, "The Blue Goose and Lesser Snow-Goose on Southampton Is., Hudson Bay," *Auk*, 1931, pp. 335–364). Specimens of nestlings carefully collected by Mr. T. H. Manning on Southampton Is., which I have been permitted to examine at the Brit. Mus., confirm Mr. Soper's observations except where the two parents were different in which cases the brood was mixed. *H.F.W.*

General habits very like grey geese. Occurs in winter-quarters and on migration in very large flocks and flies in oblique or bent lines, and angular V-formations like grey geese. Not naturally shy, but becomes very wary where persecuted. On breeding-grounds sometimes associated with Blue Goose (*Anser cærulescens*) and in winter-quarters is described as consorting freely with other species. Sometimes feeds amongst tall reeds which completely hide the birds (P. Scott). *B.W.T.*

**Voice.**—Note is always monosyllabic, like "kaw" or "kaah," or more commonly between the two, characteristically clipped at the end, so that there is really no final consonant sound, but a very sudden silence (P. Scott). G. M. Sutton describes note as loud irregular falsetto honking and distinguishes (on breeding-ground) a deep note of warning, a repeated high-pitched version of alarm, and various gabblings and groanings of feeding flock. *B.W.T.*

**Breeding.**—Nests in large numbers on open tundra, sometimes in mixed colonies with "Blue Geese" but generally of this form alone, especially in northern part of range. *Nest.*—Hollow in ground among grass or dwarf willows lined with grasses, down, feathers, moss, etc. Down pale grey. Feathers white: smaller than in Greater Snow-Goose. (See Plate 77A.) *Eggs.*—Usually 5 or 6, but may range from 4 to 7, 8 maximum; white, with faint creamy or bluish tinge with slight gloss; shape ovate. Average of 28 eggs 78·86×53·35. Max.: 83·4×55·2 and 78·7×55·4. Min.: 68·6×51 and 73·5×50·4 mm. A. C. Bent gives average of 103 eggs as 78·6×52·3 mm. Weights of 2 eggs 9·9 and 10 grams. *Breeding-season.*—From end of 2nd week in June onward. *Incubation.*—Eggs laid on consecutive days (in confinement); female alone broods, from completion of clutch; male standing not far off. Period 24–26 days (J. C. Laidlay). *Fledging.*—Young tended by both parents; feed on insects 3–4 days and then graze (Laidlay). Single-brooded. *F.C.R.J.*

**Food.**—Little definitely recorded as to food in breeding-season; on migration and in winter almost entirely vegetable matter; in spring according to A. C. Bent, largely winter wheat and other sprouting grain and grasses; in autumn stubble-fields are frequented: also *Scirpus americanus* and other rushes (P. Scott). Berries (including those of *Empetrum nigrum*), grass, wild rice, aquatic plants pulled up by the roots, and apparently aquatic insects, small Mollusca, etc., are also taken. *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. Three shot Wexford Nov., 1871.[1] One shot Barra (O. Hebrides) Oct., 1917.[2] One shot out of sixteen Moray, Aug., and one shot Norfolk, Sept., 1933.[3] Others obtained but subspecies not determined: one (another seen) Co. Longford, Oct., 1903, and one Norfolk, Jan., 1909. The following recorded as seen can also not be determined as to subspecies. *England and Scotland.*—One (perhaps obtained) Aug., 1884, Solway. A number in winters 1890–1, 1901 and 1906, Cumberland, Northumberland, Yorks, and Gloucester. Two to four Oct., 1909, to Jan., 1910, Norfolk. Two April and May, 1911, Essex. Six Oct., 1912, Norfolk. One Jan., 1921, Essex, and four Nov., 1921, Solway. Three Oct., 1922, Solway, and one Oct. and Dec., 1922, Norfolk. Two April, 1923, Solway. One Jan., 1924, Fife. Two Oct., 1925, Solway. Three winter 1927–8, two 1928–9, and three 1931–2, Islay (I. Hebrides). Four Aug., 1933, Herts, as well as sixteen Moray in same month and one Norfolk Sept. (see p. 201). *Ireland.*—Four Dec., 1903, fourteen Dec., 1906, and four Dec., 1908, Mayo. Twelve Dec., 1917, Galway. Some of the above were no doubt from Woburn where they have been kept in a free state and have bred for many years. Albinistic Pink-footed Geese have sometimes been recorded as of this species. *H.F.W.*

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[1] Measurements given by H. Saunders, *P.Z.S.*, 1872, p. 519 (♂ juv. wing $15\frac{1}{2}$ ins. (394 mm.), bill $2\frac{1}{8}$ (54), tarsus $2\frac{7}{8}$ (73), ♀ juv. wing 15 ins. (381 mm.), bill 2 (51), tarsus $2\frac{7}{8}$ (73)) indicate that these were correctly identified as of the smaller form. *H.F.W.*

[2] W. Eagle Clarke considered this with wing 401 mm. to be of the smaller form (*Scot. Nat.*, 1924, p. 9), but the bird was not mature and not sexed and was not too small for an immature female of the Greater form according to F. H. Kennard's measurements. *H.F.W.*

[3] These were examples of this form, but in all probability had come from Woburn (*cf. Brit. B.*, xxvii, pp. 166, 212 and 236). *H.F.W.*

**Distribution Abroad.**—N.E. Palæarctic and N. Nearctic regions. The smaller race breeds in arctic E. Siberia (Wrangel Is. and Tchutchki peninsula) and in arctic N. America from Pt. Barrow, Alaska to Southampton Is., Baffin Land and islands northward. Replaced by larger race apparently in N.E. of N. America (see Greater Snow-Goose). Winters in western states of U.S.A., especially California; casual in E. Canada and U.S.A.; also south to Japan on E. coast of Asia; accidental in W. Indies. In Europe reported from Iceland, Norway, Sweden, Germany?, Holland, France, Greece?, etc., but probably in many cases merely albinos. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Entire plumage except primaries and their coverts and bastard-wing white; *primaries* black, inner webs brown-black, outer primaries hoary-grey towards base; *primary-coverts* and *bastard-wing* ash-grey with dark brown shafts, in some outer webs slightly mottled white, in some bastard-wing white. Sometimes feathers of head, neck and under-parts stained rusty. Moult presumably as in other geese, but no material moulting remiges examined.

NESTLING.—Centre of back of crown and back of neck, thin line through lores and eye, and whole upper-parts grey-brown with yellowish tinge; fore-head, sides of head and neck, somewhat indefinite patches on front and hinder part of wing and on body below wing, and whole under-parts from greenish-gold to greenish-yellow. Bill nearly black, tip chrome; legs and feet brownish-ash, iris grey (T. H. Manning). *N.B.*—Much like *Branta c. canadensis* in colour but upper-parts greyer. Nestling of *A. cærulescens* is darker on upper-parts, fore-head and sides of head like upper-parts, patch of buff on chin but rest of under-parts grey-brown with yellowish tinge.

JUVENILE.—Differs from adult in having *upper-parts* more or less ash-brown; fore-head greyish-white; patch in front of eye, crown down to eye, centre of nape, mantle and scapulars ash-brown, feathers more or less tipped ash-white; sometimes some feathers of mantle greyish-white, freckled ash-brown; remaining upper-parts white (sometimes feathers of rump and upper tail-coverts slightly freckled dusky-brown); *under-parts* white, feathers of upper-breast, sides of body and flanks more or less mottled, speckled or suffused dusky-brown; *tail-feathers* ash-brown with broad white tips and edged same, outer ones with inner webs more or less white (sometimes tail-feathers white more or less mottled or freckled ash-brown); *primaries,* their *coverts* and *bastard-wing* as in adult, but sometimes primary-coverts white more or less freckled or clouded ash-brown; *secondaries* and *greater coverts* white more or less mottled or clouded ash-brown, innermost secondaries and their coverts light or dark ash-brown broadly edged white; *median coverts* pale ash-brown more or less freckled and tipped white; *lesser coverts* and median and lesser *primary-coverts* greyish-white more or less mottled ash-brown. (*Shape of feathers*) those of upper- and under-parts, tail-feathers, also greater and median coverts narrower than in adult and tips of feathers of mantle rounded not square as in adult.

FIRST WINTER AND SUMMER.—As adult, but distinguished by juvenile wing. Most of the juvenile body-feathers, tail-feathers (?) but not wings in specimen examined are moulted.[1]

MEASUREMENTS AND STRUCTURE.—♂ ad. wing 395–460 (juv. 380–430) mm., tail 115–140, tarsus 78–91, bill from feathers 51–62, depth at fore-head 32–37. ♀ wing 380–440, bill 50–61 (large number measured by F. H. Kennard). Primaries: 1st more than half longest primary-covert, 3rd longest, 2nd (below 4th) 6–18 mm. shorter, 4th 4–9 shorter, 5th 30–38 shorter, 6th 63–71 shorter. Innermost secondaries with slightly rounded tips, longest above 7th primary. Tail slightly rounded, 16, rarely 18, feathers. Bill considerably higher than broad at base, short, strong and robust, altogether deeper throughout its length than in Grey Lag; culmen sloping sharply to nail, tomia curved, commissure widely gaping, indentations of upper mandible quite apparent; teeth 20–28. Loral and frontal feathering as in White-fronted Goose. Weight *ca.* 6¼–4 lbs., average of 28, *ca.* 5¼ lbs. (Kennard).

SOFT PARTS.—Bill (ad.) lilac-red or dark red with whitish or yellowish nail, under mandible lighter, black stripes above edge of upper and on under edge of lower mandible from gape to tip; (juv.) dark grey or brownish often with greenish tint, black stripes along mandible as in adult; legs and feet (ad.) lilac or orange-red with black claws; legs and feet (juv.) dark grey or brownish often tinged green; iris dark brown (*fide* Alphéraky).

[*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Pure white body-plumage of adults and light ash-brown broadly margined white upper-parts of juvenile with black wing-feathers distinguish this from other British geese. For distinctions of Greater Snow-Goose see under that form. [*A.C.M.*]

*PLATES 77a and 79a.*

## 309. THE GREATER SNOW-GOOSE—Anser hyperboreus atlanticus (Kennard)[2]

CHEN ATLANTICA Kennard, Proc. New. Engl. Zool. Club., ix, p. 93 (Feb. 16, 1927—Black Bay, Princess Anne County, Virginia).
*Anas nivalis* Forster, Philos. Trans., lxii, p. 433 (1772—Severn R., Hudson Bay, Canada).
*Chen nivalis* (Forster), Sharpe, Bull. B.O.C., x, p. xv.
*Anser hyperboreus nivalis* (Forster), Pract. Handb., ii, p. 249.

**Habitat.**—As Snow-Goose. *B.W.T.*

**Field-characters and General Habits.**—Larger than Snow-Goose, but size varies and subspecific determination of Snow-Geese straggling to W. Europe must be considered impossible in the field, though A. C. Bent states that present form is not only larger than *A. h. hyperboreus*, but a much heavier bird with a much more stocky build, thicker neck, and larger head. Total length *c.* 30 ins.; body *c.* 19 ins.

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[1] One (17.6.10 Greenland, Schiöler coll.) had one new central tail-feather and had acquired some new white innermost secondaries; some ash-brown juvenile body-feathers retained on mantle. *A.C.M.*

[2] Mr. F. H. Kennard has shown (*loc. cit.*) that Forster's description of *nivalis* is insufficient to show to which form the bird belonged and that from present knowledge of distribution Forster's specimens were probably of the lesser form.

Habits as Snow-Goose. *B.W.T.*

**Voice.**—Not known to differ from Snow-Goose. *B.W.T.*

**Breeding.**—Differs little from that of typical form, nesting in depressions among tussocks on grassy flats, dotted with lakes; also on Eider-holms off coast and sometimes on top of cliffs (D. Haig-Thomas). *Nest.*—Hollow on ground lined moss, grasses, etc., built up with mud and dead vegetation mixed with down and white feathers larger than those of typical race. (See Plate 77A.) *Eggs.*—Said to be 3–7 in number, broad ovate, dull white. Average of 7 eggs from Davis Strait ascribed to this race, 81·8×55·1. Max.: 84·4×54·2 and 81×57·4. Min.: 79×53·2 mm.; apparently larger than those of *A. h. hyperboreus*. *Incubation.*—By female alone, gander remaining on guard by nest. Period about four weeks (W. Ekblaw). *Fledging.*—Both parents tend young (L. Gibson). Single-brooded. *F.C.R.J.*

**Food.**—Little definitely recorded. A. C. Bent quotes E. J. Lewis, who states that this species feeds on roots of marine plants, especially sea-cabbage; also roots of sedge and other plants. H. H. Bailey says beach-grass and other sand-dune plants are pulled up in order to eat the roots; but that the birds do not come into fresh-water bays to eat fox-tail grass. These records refer to wintering birds, but W. E. Ekblaw describes summering birds as feeding at the bottom of a shallow pool in which *Pleuropogon* and *Hippuris* were growing abundantly. *F.C.R.J.*

**Distribution.**—*Ireland.*—Two (out of flock of seven) obtained Oct., 1877, Mayo.[1] One, Belmullet (Mayo), Oct., 1886 (*ut supra*: *cf.* R. J. Ussher, *List Irish Birds*, p. 33). *Scotland.*—Flock of about 5, one shot Oct., 1920, not preserved, another (immature) shot Feb. 18, 1921, near Castle Douglas (Kirkcudbright) (C. W. Phillips, *Field*, Mar. 5, 1921, p. 299; W. Eagle Clarke, *Scot. Nat.*, 1921, pp. 48, 69).[2] Others recorded under the typical form (*q.v.*) may have belonged to the Greater. *H.F.W.*

**Distribution Abroad.**—N.E. Nearctic region, but few breeding records. Definitely recorded Thule, Inglefield Bay, McCormick Bay, N.W. Greenland: apparently N. Baffin Land: possibly Axel Heiberg Land and north to 82° in Grinnell Land. Winters in eastern U.S.A. (Maryland, Virginia, N. Carolina); accidental Hudson Bay. Replaced in arctic Canada to south and west by smaller race. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE.—Identical in all plumages with Snow-Goose, but larger. Wing-moult end July (D. Haig-Thomas).

MEASUREMENTS AND STRUCTURE.—♂ ad. wing 430–485 (juv. 420–440) mm., tail 135–160, tarsus 86–97, bill from feathers 59–73, depth at fore-head 34–44. ♀ wing 425–475 (juv. 390–445), bill 57–68. (20 ad. ♂, 8 juv. ♂, 10 ad. ♀, 15 juv. ♀ measured by F. H. Kennard.) Bill larger, stronger and deeper (with some exceptions) than in Snow-Goose. Weight *ca.* 10 lbs. 7 ozs.–5 lbs. 6 ozs., average of 27 *ca.* 7 lbs. (Kennard).

SOFT PARTS.—Bill and legs of female turned grey towards end of incubation, but those of male remained pink (D. Haig-Thomas). *H.F.W.*

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[1] H. Saunders considered these to belong to the typical form, but one of them, a male now in Dublin Mus., has a bill of 67 mm. (*fide* G. R. Humphreys) and must be referred to the Greater form. *H.F.W.*

[2] Female immature wing 440 mm., bill 64. *H.F.W.*

## Genus **BRANTA** Scop.

Branta Scopoli, Annus I. Hist. Nat., p. 67 (1769—Type by tautonymy *Branta* Aldrovandus in synonymy equals *Anas bernicla* L.).

In general much like *Anser*, but no teeth or serrations visible on cutting edge of upper mandible. Four species (and a number of subspecies) in Palæarctic and Nearctic (Holarctic) regions.

*PLATES 77 and 77a.*

### 310. THE RED-BREASTED GOOSE—Branta ruficollis (Pall.)

Anser ruficollis Pallas, Spicilegia Zool., fasc. vi, p. 21, pl. iv (1769—Lower Ob River in Siberia and S. Russia).
*Bernicla ruficollis* (Pallas), Yarrell, iv, p. 281 ; Saunders, p. 407 ; Pract. Handb., ii, p. 250.

**Habitat.**—In breeding-season appears chiefly to frequent neighbourhood of arctic rivers, where river-cliffs or steep fissured banks and bluffs afford breeding-sites. Outside breeding-season frequents mainly grasslands and crops of Aralo-Caspian steppe, retiring at night to sea, where it probably roosts on sandbanks or islands like grey geese. *B.W.T.*

**Field-characters and General Habits.**—*Striking and curiously "formal" colour-pattern of black, white and chestnut-red* renders Red-breasted Goose unmistakable. Crown, back of neck and band from crown to chin, enclosing eye, black, patch between eye and bill white, patch on ear-coverts and whole front of neck with upper breast chestnut-red with sharply defined white borders ; upper-parts and lower breast black, with greyish-white edgings to wing-coverts, flanks white barred black, upper and under tail-coverts and region of vent white, tail black. Sexes similar. Bill and legs blackish, bill very small, short and delicate. Young are duller coloured, with blacks more dusky, patch on ear-coverts brown and not sharply defined, and chestnut of neck and breast pale and dingy. Total length *c.* 21–22 ins. ; body *c.* 16 ins.

Habits much as grey geese. In winter-quarters and on migration it occurs in great numbers and often associates with Lesser White-fronted Geese. According to Zhitnikov (quoted by S. Alphéraky) flocks passing to and from feeding-grounds fly in irregular crowds, more rarely (and only in case of small flocks) in more or less transverse lines, but very seldom in single file or wedge formations. All movements are very quick and head moves astoundingly fast in plucking grass (P. Scott). *B.W.T.*

**Voice.**—Call is a double staccato screech and cannot really be expressed with consonants, though "kee—kwa," "kik—wik," "ti—che," etc., approach it. Simply a repetition of long and short "e" sounds, "ē—e," comes nearer. There are always two syllables, which are completely disjointed ; second sounds as though it is a strain on the voice, as the note seems a little broken. When feeding, flock emits a constant series of high staccato squeaks of quarreling (P. Scott). Also hisses when angry (G. Radde). *B.W.T.*

**Breeding.**—In Siberia nests on banks of rivers, sometimes on edge of earthen cliffs or half way up steep slopes with patches of low scrub, either singly or in small colonies of a few pairs. Nests may be found not more than 20 ft. apart and have almost always been placed close to an occupied breeding place of Peregrine Falcon, or Rough-legged Buzzard. *Nest.*—A mere hollow, thickly lined with down, mixed with grasses. Down dull rather dark brown, some with lighter centres. Feathers small, mostly white, but a few black-tipped. (See Plate 77A.) *Eggs.*—S. Naumow records 4 to 5, but H. L. Popham found 7 to 9 in nest and describes them as "creamy-white," but his eggs have a greenish-grey cast and Naumow states that they have a dirty greenish tinge when fresh; becoming stained as incubation progresses; very slight gloss; blunt ovate in shape. Average size of 26 eggs, 70·61×48·66. Max.: 72×45 and 70·9×49. Min.: 60·8×43·8 mm. Weight of an egg, 6·2 grams. *Breeding-season.*—Last two weeks of June. *Incubation.*—By female alone, male remaining on tundra or on water within reach. Period 25 days (in incubator). Single-brooded. *F.C.R.J.*

**Food.**—Apparently in a natural state grazes on young shoots of grass almost exclusively, but in confinement can be accustomed to take barley and wheat, though green food is always necessary to them (S. Alphéraky). *F.C.R.J.*

**Distribution.**—*England.*—Very rare vagrant. One near London early 1766. One near Wycliffe (Yorks) about same time. One near Berwick-on-Tweed (Northumberland), 1818. One Maldon (Essex), Jan. 6, 1871. Two said to have been got south Devon, and one Norfolk (Saunders, p. 407). One Severn (Gloucester), Nov. 18, 1909 (*Brit. B.*, iii, p. 376). One Milford Haven (Pembroke), Jan. 18, 1935 (*op. cit.*, xxviii, p. 311). Others recorded, but not substantiated. *H.F.W.*

**Distribution Abroad.**—Breeds central N. Palæarctic region. In west to Yalmal and N.W. Siberia; east to R. Boganida. Winters in Hungary in small numbers, Caspian Sea (nr. Lenkoran), probably Aral Sea and Turgai territory, N. Persia, sporadically Iraq. Also occurs S. Russia. Accidental in Greenland, Iceland, Novaya Zemlya, S. Sweden, Finland, Baltic states, Denmark, Germany, Holland, Belgium, France, Austria, Poland, Czecho-Slovakia, Italy, Yugo-Slavia, Romania, Bulgaria, Greece, Algeria and Egypt. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—(*Head* and *neck*) fore-head, crown down to eye, cheeks below eye and nape black, black of nape continued on to upper-mantle; oval or roundish white patch in front of eye extending to bill, irregular square russet patch on sides of neck, outlined in white; behind eye small white patch which narrows into a white line merging with white line running parallel with nape on to upper-mantle; chin and throat black, feathers tipped white, chin intermixed with white, black of throat in some continued below white streak towards nape; *rest of neck* and *upper-mantle* and *upper-breast* russet; a white band bordered above by a narrow black band encircles *upper-mantle* and *breast*, a white bar in front of wing; (*rest of upper-parts*) mantle, scapulars, back and rump black with dull greenish gloss, scapulars in some narrowly tipped black-brown; lower scapulars black-brown, tipped white; sides of back and rump, and upper tail-coverts white; (*rest of under-parts*) lower-breast below white band black, feathers with white bases; sides of belly and flanks white, some feathers tipped black, flanks broadly so; thighs white, some feathers with black-brown tips; belly, vent and under tail-coverts white, white of belly joining black of breast in an inverted V-shaped line; axillaries dark sepia, under wing-coverts black, under primary-coverts drab-grey; (sometimes some rusty-brown feathers on sides of belly, thighs, upper and under tail-coverts); *tail-feathers* black, narrowly tipped white, outer ones with inner webs brown black; *primaries* and their *coverts*, *secondaries* and *bastard-wing* black with greenish gloss, inner webs black-brown or sepia (in some primary-coverts more or less greyish-white at tip); rest of *wing-coverts* black with greenish gloss, *greater coverts* and lower row of *median* broadly tipped white. This plumage is acquired by a complete moult in autumn; (one flightless specimen examined, Aug. 12th, Yenisei, with remiges all in quill). SUMMER.—No spring material examined. Coloration as in winter.

NESTLING.—Crown and upper-parts sepia tinged greenish, fore-head, nape and spot below wing and near tip of wing yellowish; round eye sepia; under-parts pale greenish-yellow, but dark grey bases of down show more or less, especially at base of neck. An older bird beginning to grow feathers has upper-parts browner without greenish tinge and under-parts brown with centre of throat and breast and belly pale cream.

JUVENILE.—As adult, but black of *upper-parts* and *head* browner, white band round *upper-mantle* and *breast* less clearly defined, feathers margined black-brown and not bordered above by a black band as in adult; russet patch on *neck* smaller and paler, feathers tipped black-brown or whitish; *rest of upper-mantle* and *upper-breast* pink-cinnamon rather than russet, some feathers mottled dusky-brown towards tip; sides of *belly* and *flanks* white tipped black-brown; *lower-breast* brown-black, feathers with imperfectly concealed white bases; *tail* and *wing* as in adult but brown-black, tail-feathers usually more broadly tipped white; *greater* and *lower median coverts* with brownish-white tips, rest of median coverts narrowly tipped brownish. (*Shape of feathers*) those of mantle, scapulars and under-parts smaller and narrower, tail-feathers, secondaries, greater and median coverts narrower.

FIRST WINTER AND SUMMER.—Apparently as adult but many juvenile feathers are retained on upper- and under-parts; wing as in juvenile. Some juvenile body-feathers, not all feathers of upper-parts, not breast, belly, vent or under tail-coverts, not tail or wings are moulted from autumn onwards. (Very little material examined.)

MEASUREMENTS AND STRUCTURE.—♂ wing 345–361 mm., tail 99–109, tarsus 52–58, bill from feathers 24–26 (5 measured). ♀ wing 342–357, bill 23–27. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 3rd longest, 2nd 3–9 mm. shorter, 4th 9–14 shorter, 5th 30–40 shorter, 6th 55–68 shorter, 2nd emarginated inner web, 3rd both webs, 4th outer web. Innermost secondaries with rounded tips, longest above 7th primary. Upper tail-coverts extend two-thirds length of tail, under tail-coverts nearly to tip. Tail almost square, slightly rounded, 16 feathers. Feathers of neck normal not "furrowed." Bill much shorter than head, higher than broad at base, somewhat conical, depressed terminally, dorsal line straight and sloping to nail; nail round and convex; intercrural space feathered almost to nail; tomia almost straight; teeth 16, not visible externally when bill shut. Loral feathering extends farther forward on bill than frontal feathering.

SOFT PARTS.—Bill, legs and feet black; iris dark chestnut.

[*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. White patch on lores and russet upper-breast (paler in juvenile) distinguish this species in all plumages. [*A.C.M.*]

*PLATES 77a and 79.*

## 311. THE BARNACLE-GOOSE—Branta leucopsis (Bechst.)

ANAS LEUCOPSIS Bechstein, Orn. Taschenb., ii, p. 424 (1803—Germany).
*Bernicla leucopsis* (Bechstein), Yarrell, iv, p. 286; Saunders, p. 409.
*Branta leucopsis* (Bechst.), Pract. Handb., ii, p. 252.

**Habitat.**—In breeding-season frequents marshes and river valleys in mountainous districts of arctic where outcrops of harder strata forming ranges of cliffs or rocky stacks and bastions on hillsides afford suitable breeding-sites.

Outside breeding-season resorts chiefly to pastures, marshes and grasslands close to shore, a favourite feeding-ground being stretches of "machar" land of firm springy turf inside sandhills, and will also feed at times on tidal flats and on bogs and cultivated land, especially if driven by frost. Only exceptionally inland. *B.W.T.*

**Field-characters and General Habits.**—Boldly contrasted black, white and grey of plumage is distinctive and permits identification at long range. *Crown, neck and breast glossy black, whole face and fore-head creamy-white, except for blackish mark from bill to eye, upper-parts lavender-grey with blackish bars narrowly bordered white,* rump and under tail-coverts white, rest of under-parts pale greyish, flanks faintly barred, quills and tail black. Bill and legs black. Bill short, small and delicate. Larger than Brent. Young with white of face tinged dusky, rufous edgings to mantle-feathers, and flanks more strongly barred. Wings rather pointed. Total length *c.* 23–27 ins.; body *c.* 17–18 ins.

Flight, general habits and behaviour much as other geese, but generally a good deal less wary and suspicious than the other species and "only one which on occasion will fail to take alarm after having seen and distrusted a moving object within 100 yards" (W. Percy). Occasionally goes to sea to rest on very calm days, but much more terrestrial than Brent. Feeds largely at night, but to some extent also by day. Gregarious, occurring in flocks from a dozen or less to hundreds. "A common trait in all geese, but more noticeably so in this species is a continual series of friendly quarrels amongst a feeding flock" (Percy). Flocks seldom associate with other geese, but odd birds or even small parties sometimes graze with grey geese. *B.W.T.*

**Voice.**—Note a series of rapidly repeated, short, monosyllabic barks, some higher than others, chorus of flocks recalling shrill yelping of pack of small terriers. Also lower, more conversational notes when feeding. "Triumph-note" high-pitched and shrill, unlike that of other geese (O. Heinroth). Usual note on breeding-ground a loud complaining "ark" (F.C.R.J.). *B.W.T.*

**Breeding.**—No reliable information prior to A. Koenig's discovery of nests in Spitsbergen, but now confirmed from other sources. Breeds in large or small colonies, usually on ledges and niches in face of steep cliffs or bastions of rock projecting from sides of valleys, evidently for protection against predatory mammals, such as arctic fox. Also has been found nesting exceptionally on low-lying islands formed by different channels in river estuary; protection being here afforded by water. *Nest.*—Same hollow often used year after year; plentiful supply of down, with droppings of birds and a few fragments of moss or lichens. Down has indistinct white centres; is decidedly darker grey than that of Pink-footed Goose, and lacks brownish tinge of Eider down, in which the sprays are also much larger. Feathers small, greyish-white, once a small black feather. (See Plate 76A.) *Eggs.*—3 to 5 as a rule, occasionally 6, greyish-white, without gloss, and rather fine in texture, readily staining. Average size of 71 eggs (12 by Le Roi), 76·17×50·25. Max.: 82·7×46·4 and 78·4×53·6. Min.: 68·7×49·5 and 82·7×46·4 mm. Average weight of 15 eggs, 10·49 grams (9·4 to 12·03 gr.). *Breeding-season.*—From last days May to mid-June (Spitsbergen). *Incubation.*—By female only: male standing close at hand; begins apparently on completion of clutch. Period (in captivity) 24–25 days. *Fledging.*—Young leave nest when dry and make their way down to water; tended by both parents. Period about 7 weeks (in captivity, J. C. Laidlay). Single-brooded. *F.C.R.J.*

**Food.**—On breeding-grounds in Greenland, twigs, leaves and catkins of alpine willow, seeds of various plants and grass (A. L. V. Manniche). In Spitsbergen leaves of *Oxyria digyna* and stalks of *Gramineæ* (O. Le Roi). In winter-quarters, J. W. Campbell estimated 93·2% green grasses; 1·2% clover; 4·8% leaves of other plants and 0·4% *Equisetum*. Grasses identified: *Glyceria maritima*, *Festuca rubra* and *Poa*; clover, *Trifolium repens*; other plants, *Bellis perennis*, *Ranunculus repens*, *Caltha palustris*, *Apium nodiflorum*, *Equisetum palustre*; moss, *Hypnum cuspidatum*; hepatic, *Lophocolea bidentata*. S. Alphéraky includes marine Mollusca and T. A. Coward Crustacea, but these require confirmation. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Winter-visitor (sometimes mid-Sept. and occasionally earlier, but usually Oct. to mid-Nov. to April-May, exceptionally June). Main haunts Inner and Outer (decreased) Hebrides and Solway (decreased). Scarce and irregular to most other parts of coasts usually in severe weather and in small numbers (rare S. England), but fairly regular on passage Shetlands and Orkneys and Northumberland. *Ireland.*—Regular on coasts and islands Galway, Mayo, Sligo, Donegal, Antrim and Louth, occasional elsewhere. *H.F.W.*

**Distribution Abroad.**—Western part of N. Palæarctic region; only known breeding places N.E. Greenland, Spitsbergen and Novaya Zemlya (possibly occasionally Iceland and Kolguev but no proof). On passage Iceland, Færoes, Scandinavia and Finland, wintering south to N. France, Holland, Belgium, Denmark, Germany, Baltic states and Poland. Casual in E. Canada and U.S.A.; accidental in Jan Mayen, Azores, Marocco, S. Spain, Portugal, Italy, S. France, Switzerland, Austria, Hungary, Czecho-Slovakia, central Russia and Egypt. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—(*Head* and *neck*) fore-part of crown, sides of face, chin and throat cream-white or light buff, some feathers when fresh with faint dusky tips (sometimes chin and upper-throat spotted blackish forming irregular streak); lores brown-black; feathers at base of upper mandible and those extending on to lower mandible in some more or less tipped brown-black; rest of head, neck and upper-breast black; (*rest of upper-parts*) mantle black, feathers with grey bases often imperfectly concealed and narrowly tipped brownish-white; scapulars ash-grey with broad subterminal bands of brown-black and narrowly tipped brownish-white, or white, lower scapulars and back dark ash-grey, tipped brown-black; rump black; sides of back and rump, and upper tail-coverts white; (*rest of under-parts*) sides of body and flanks palest ash-grey, feathers with subterminal bar or shading of dusky-brown and broadly tipped white; thighs black, feathers usually narrowly tipped white; axillaries ash-grey; under wing-coverts ash-grey, mostly tipped white and some with subterminal dusky-brown shading; remaining under-parts white; *tail-feathers* black; *primaries* black or brown-black, outer, and sometimes inner, webs ash-grey on basal two-thirds; *secondaries* brown-black, outer, and inner webs towards base, ash-grey, innermost as scapulars; *primary-coverts* and *bastard-wing* ash-grey darker on inner webs and at tips; rest of *wing-coverts* ash-grey with broad subterminal bands of black or brown-black and broadly tipped white, *lesser* and some *median coverts* sometimes with black subterminal bands more or less concealing grey bases. This plumage is acquired by complete moult July to Dec.; as in other geese remiges appear to be three-quarters grown before body and tail moult commences in earnest. SUMMER.—One (♂ 16.4.04, coll. E. L. Schiöler) was moulting some feathers of neck, upper-mantle and sides of face. No other spring material examined. Coloration as in winter.

NESTLING.—Centre of crown and upper-parts pale brown; fore-part and sides of crown and nape whitish, down with some brown tips; whitish spots at back and tip of wing and another below wing; narrow dark line through lores and round front of eye; sides of head and under-parts white with a patch of pale brown across upper-breast, bases of down pale brown. (One examined. Browner on upper-parts and whiter on sides of head and under-parts than in Brent Goose.) (H.F.W.)

JUVENILE.—*Neck, upper-mantle* and *upper-breast* dull grey-black, grey bases of feathers imperfectly concealed; (*rest of upper-parts*) mantle brown-black (not black as adult), feathers with imperfectly concealed grey bases and tipped brownish-white; scapulars ash-grey, ash-brown towards brownish-white tips and without broad subterminal black-brown bands as in adult; some upper tail-coverts faintly tipped dusky-brown; (*rest of under-parts*) sides of body and flanks very pale ash-brown shading to white, not ash-grey with a subterminal bar of dusky-brown and tipped white as in adult; remaining under-parts and *tail* as in adult; *wing* as in adult but *greater* and *median coverts* with subterminal bands of black-brown or dark sepia (instead of brown-black or black) and narrowly tipped brown or brownish-white (not white as in adult); *lesser coverts* as in adult, but white tips in some absent and subterminal bands paler and browner. (*Shape of feathers*) those of mantle, scapulars and under-parts smaller and narrower than in adult; and tail-feathers, secondaries, greater and median coverts narrower.

FIRST WINTER AND SUMMER.—Like adult, but easily distinguished by retained juvenile *greater* and *median coverts* which besides being narrower and more worn are not broadly tipped white as in adult, but at most have brown or brownish-white tips, subterminal bands brown instead of brown-black or black as in adult; *tail-feathers* and *secondaries* narrower. Most of the juvenile body-feathers, not back, rump or apparently tail-coverts and not tail or wings in specimens examined, in some an odd median covert, are moulted in autumn and winter. In most (all ?) examples many juvenile feathers are retained so that black areas of upper- and under-parts appear browner than in adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 385–420 mm., tail 119–140, tarsus 63–74, bill from feathers 27–32 (12 measured). ♀ wing 385–417, bill 28–31 (10 measured). Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd as long or 5–16 mm. shorter, 4th 5–12 shorter, 5th 33–48 shorter, 6th 63–79 shorter. Longest innermost secondaries above 6th primary. Upper tail-coverts extend to half and under tail-coverts to three-fourths length of tail. Tail rounded, 16 feathers. Bill as in Red-breasted Goose; teeth about 30. Weight 5–2½ lbs., average of 55, 4 lbs. (H. L. Popham).

SOFT PARTS.—Bill, legs and feet black; iris brown.

[*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Black crown and neck, creamy-white fore-head, cheeks, chin and throat and barred wing-coverts distinguish this species in all plumages. [*A.C.M.*]

*PLATES 77a and 79.*

## 312. THE DARK-BREASTED BRENT GOOSE—Branta bernicla bernicla (L.)

ANAS BERNICLA Linnæus, Syst. Nat., ed. x, i, p. 124 (1758—" Habitat in Europa boreali; migrat supra Sveciam ").

*Bernicla glaucogaster*[1] Brehm, Handb. Naturg. Vög. Deutschl., 1831, p. 849; Hand-List, 1912, p. 133.
*Bernicla brenta* (Pallas), Yarrell, iv, p. 290; Saunders, p. 411.
*Branta bernicla bernicla* (L.), Pract. Handb., ii, p. 255.

**Habitat.**—In breeding-season frequents chiefly deltas and wide valleys of arctic rivers, seldom very far from sea; also islands off coast. Outside breeding-season exclusively maritime, frequenting tidal flats and estuaries, chiefly where *Zostera* is abundant, resting on water at high tide and retiring to sea at night or if disturbed. Only quite exceptionally as straggler inland. *B.W.T.*

**Field-characters and General Habits.**—Brent is smallest and much the darkest of the geese. *Whole head, neck and upper breast black with small whitish patch on sides of neck. Upper-parts dark grey-brown or slaty, with narrow lighter edgings to feathers.* Upper and under tail-coverts and region of vent pure white, in contrast to rest. Quills and tail black. No white mark on neck of juvenile. In Dark-breasted form lower breast and flanks are slaty and not strikingly paler than upper-parts, though some are a good deal paler than others; paler bars on flanks. Pale-breasted form has lower breast and especially flanks considerably paler and shading to whitish posteriorly, though here again there is a good deal of variation. The two forms sometimes occur in mixed flocks, but K. B. Rooke has described such a flock subsequently separating into Dark- and Pale-breasted groups, which also flew separately. G. H. Caton-Haigh states that mixed flocks often separate thus when put up. Rather stocky and duck-like in flight, with white stern conspicuous. Bill and legs black. Total length *c.* 22–24 ins.; body *c.* 16–17 ins.

Flight swift, much like that of other geese. Flocks seldom adopt V-formation, but fly in irregular packs or in lines strung out at approximately right-angles to course (or sometimes more trailing) which writhe and undulate in a graceful manner and with perfect co-ordination, usually at no great height. Extremely gregarious (according to A. Chapman "a single Brent is invariably a pricked bird"), occurring in flocks up to many hundreds, which feed on the *Zostera* beds when uncovered by the tide or paddle in the shallow water, dipping the head or "up-ending" like ducks to reach the plants. These are mostly pulled up bodily, the roots being preferred; leaves are also eaten to some extent, but a good deal is often allowed to drift away, a fact sometimes taken advantage of by Wigeon which accompany the larger birds. H. Gätke also describes birds picking molluscs, etc., off base of cliffs when sea is calm. Mainly diurnal feeders, though tide naturally affects movements. They are apt to take resting period in middle of day and rest on the water when tide is up, also retiring to sea at night. Young or adults when unable to fly can dive well, but latter appear more reluctant to do so. A. Trevor-Battye describes how in the great goose drives of the Samoyeds on Kolguev the Brents do not attempt to escape by diving, though the grey geese do so. *B.W.T.*

**Voice.**—Note a guttural, croaking "krrowk," "krrook," "rruk," etc., usually a single syllable, but sometimes more disyllabic, with "running accompaniment of lower croaks and shrill bi-tones" (A. Chapman). Alarm-note is rendered "wauk" (J. Cordeaux) and it has the usual anserine hiss. *B.W.T.*

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[1] In no case can the name "*glaucogaster*" be used for the white-bellied form, as it was given by Brehm to grey-bellied specimens shot on the coast of Germany.

**Display and Posturing.**—On breeding-ground pursuit-flights take place, but their precise nature is not known: H. W. Feilden records that "the goose and the gander rise to a great height in the air by spiral flights, very unlike their usually staid and methodical behaviour." Concealing posture on nest, with neck extended, is same as in grey geese. *F.C.R.J. & B.W.T.*

**Breeding.**—H. L. Popham found this race breeding on islands north of Golchika; Birula describes it as nesting on elevated parts of tundra strewn with débris of rocks, placing its nest among them. *Nest.*—Space between rocks is first filled with moss and then hollow is freely lined with down, which is more abundant than with other geese: brownish-grey, sprays fairly large, light centres, but indistinct. Feathers grey. (See Plate 77A.) *Eggs.*—Usually 3 to 5; similar to those of Pale-breasted race. Average of 9 eggs, 74·96×47·01. Max.: 76·5×47 and 76×48. Min.: 73×46·5 and 76×46 mm. Average weight, 7·22 grams (7·42–6·80 gr., T. Pleske). *Breeding-season.*—From about mid-June onward. *Incubation.*—By female; male on guard close at hand. Single-brooded. *F.C.R.J.*

**Food.**—No details available as to food of this race in breeding-haunts in Siberia. In winter-quarters its main food is *Zostera marina*, but "laver" (*Ulva latissima*) has also been found in stomachs and also grass. Owing to the disappearance of *Zostera* it has been forced to find other feeding-grounds in Denmark. Mollusca and Crustacea recorded by H. Gätke as taken from rocks in calm weather. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Winter-visitor (odd birds occasionally end Aug., small numbers Sept., Oct. and bulk later, to end March, some linger April and even May, and exceptionally June). Distribution of two forms not yet clear. Main haunts of Dark-breasted form E. coasts England from Northumberland to Essex, and in less numbers from Kent to Dorset and in S. Wales, flocks frequently stated to be a mixture of Dark and Pale-breasted, but Dark form predominates Northumberland, Lincs and Essex (P. Scott), Suffolk about equal (C. B. Ticehurst); also Tay (all Dark, J. Berry) and Forth (mostly Dark, Berry). Scarce and irregular S.W. and W. England and rest of Wales and Solway. Very rarely far inland, but regular in Cambridge washes. Rare visitor Orkneys and Shetlands (? form) and in other parts of Scotland replaced by Pale-breasted form (*q.v.*). *Ireland.*—Species found on all coasts but scarcer S. Rarely inland. Has been noted June and July (? form). Pale-breasted form (*q.v.*) largely predominates (Scott). *H.F.W.*

**Distribution Abroad.**—A Holarctic species. Dark-breasted race breeds from Kolguev, Waigatz, Novaya Zemlya and Yalmal peninsula east to western arctic Siberia: replaced from Taimyr east to the Pacific in Siberia, and from Alaska east to Coronation Gulf in arctic Canada by *B. b. nigricans*; also from Spitsbergen group westward to Greenland and eastern arctic Canada by *B. b. hrota.* (Evidence as to Franz Josef Land contradictory: G. Gorbunov says "*glaucogaster.*") Typical race migrates S.W. through N. Russia and Scandinavia to North Sea coasts, Denmark, Holland, Belgium, France, and south to Portugal, Marocco, Egypt. Accidental in Færoes, Yugo-Slavia, Romania, S. Russia, Turkey, Asia Minor, Cyprus, Tunisia, Azores, etc., but few specimens racially determined. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—*Head* and *neck* all round, *upper-mantle* and *upper-breast* sooty-black; on *side of neck* an irregular patch of white, feathers being banded subterminally or tipped white (sometimes these patches almost meet on front of neck, sometimes feathers of nape in this area have concealed white subterminal bars); (*rest of upper-parts*) mantle, scapulars, back and rump hair-brown, feathers of mantle and scapulars more or less with grey bloom and brown tips; short central upper tail-coverts black-brown; sides of rump and rest of upper tail-coverts white; (*under-parts*) sides of body and flanks brown-grey, feathers broadly tipped brownish-white; rest of breast and belly brown-grey to dark slate-grey, usually of uniform appearance and varying in dept of colour; vent and under tail-coverts white; axillaries and under wing-coverts brown-grey; *tail-feathers* sooty-black; *primaries* and *secondaries* black, inner webs more or less black-brown; *primary-coverts* and *bastard-wing* hair-brown; rest of *wing-coverts* as mantle, but narrowly edged light brown. This plumage is acquired by a complete moult. SUMMER.—Two or three April birds examined were moulting some feathers of head, neck and body, but whether this is due to a spring moult or a delayed winter moult, more material is required to decide. Coloration as in winter.

NESTLING.—(Not examined.)

JUVENILE.—Like adult, but no white patch on *side of neck* (a small white spot on chin in some), black of *head, neck, upper-mantle* and *upper-breast* duller and browner, feathers of rest of mantle and scapulars hair-brown and mostly tipped ash-brown or ash-white; *under-parts* paler than in adult, sides of body and flanks paler brown-grey shading to ash-white at tip and not with contrasting brownish-white tips as in adult; *tail-feathers* as in adult, but more or less tipped white and central pair in some with inner webs more or less white; *wing* as in adult, but secondaries (in some also primary-coverts, greater and lower median coverts) tipped white, rest of *median* and *lesser coverts* tipped ash-white, tips narrower on lesser coverts and in some absent. (*Shape of feathers*) those of mantle, scapulars and under-parts smaller and narrower than in adult, tail-feathers, secondaries, greater and median coverts narrower.

FIRST WINTER AND SUMMER.—Like adult but distinguished by white tips to *secondaries*, also *primary, greater* and some *median coverts*; greater and median coverts narrower than in adult. The juvenile body-feathers (apparently not feathers of back or always all tail-coverts), usually some or all tail-feathers, sometimes some innermost secondaries and coverts and some median coverts are moulted from autumn onwards. Sometimes moult is very incomplete and many juvenile feathers including tail and wings are retained.

SECOND WINTER AND SUMMER.—Apparently as adult.

MEASUREMENTS AND STRUCTURE.—Measurements of the two races do not seem to differ, extremes, both sexes, of *migrants* are:—wing 295–357 mm., tail 85–120, tarsus 55–66, bill from feathers 29–37 (H.F.W.). Primaries: 1st narrow, pointed and more than half longest primary-covert, 3rd longest, 2nd 3–9 mm. shorter, 4th 9–13 shorter, 5th 25–38 shorter, 6th 46–61 shorter. Innermost secondaries slightly pointed at tip, longest above 6th primary. Upper and under tail-coverts reach to tip of tail. Tail rounded, 16 feathers. Feathers of neck sometimes with a "furrowed" appearance. Bill as in Red-breasted Goose but larger and sides compressed; teeth 28–30. Loral feathering does not extend beyond frontal feathering, feathering on intercrural space extends barely half-way towards nail. Weight 4 to 2¾ lbs., average of 25, 3 lbs. 10 ozs. (H. L. Popham).

SOFT PARTS.—Bill, legs and feet black, upper surface of toes tinged olive-green; iris dark brown. [*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Uniform black head distinguishes species. For differences of Pale-breasted Brent see that form. In *B. b. nigricans* (west N. America, arctic Siberia) adult and first winter have pronounced white collar nearly meeting on nape, lower-breast and belly sooty-brown, in juvenile collar is not defined, feathers of sides of neck only having white tips, upper-parts at all ages darker than in *B. b. bernicla*. *H.F.W.*

*PLATES 77a and 79.*

## 313. THE PALE-BREASTED BRENT GOOSE—Branta bernicla hrota (Müller) [1]

Anas Hrota Müller, Zool. Dan. Prodr., p. 14 (1776—Iceland).
*Branta bernicla bernicla* (L.), part. Pract. Handb., ii, p. 255.

**Habitat.**—As Dark-breasted Brent Goose. *B.W.T.*

**Field-characters and General Habits.**—See under Dark-breasted Brent Goose. *B.W.T.*

**Breeding.**—Shows strong tendency to social breeding and where undisturbed may nest in considerable numbers on islands off coast or in fjords; also on islands formed by branches of streams; occasionally on peninsula or on mainland, but always near water and generally near the sea. Has been found nesting on Eider-holms. *Nest.*—Scrape in ground, lined with vegetable matter, moss, grasses, saxifrage stems, etc., mixed with down as incubation proceeds. Down plentiful, in colour much like that of Common Eider but sprays smaller; indistinct light centres. Feathers greyish-white. (See Plate 77A.) *Eggs.*—Usually 4, sometimes 3 only or 5, rarely 6, 7, 8 and 2 only also on record. Shape rather long ovate, blunt tips, creamy or yellowish, smooth surface, shell rather thin. Average of 240 Spitsbergen eggs, 70·32× 46·48. Max.: 78·5×50·5 and 74·1×51·1. Min.: 63·5×42·5 and 73× 41·4 mm. (O. Le Roi); 50 by writer, 71·8×47·2 mm. Average weight 6·69 grams (9·5 to 5·14 gr., Le Roi). *Breeding-season.*—In Spitsbergen from early June; mostly about mid-June; in Grinnell Land, latter half of June. *Incubation.*—By female alone; male on guard close at hand. Le Roi noticed differences in stages of incubation; probably eggs covered before incubation begins, but sometimes are "frosted." Period estimated about 28 days (Le Roi). *Fledging.*—Young tended by both parents, female leading, male behind: much about same size. Only one brood possible. *F.C.R.J.*

**Food.**—On breeding-grounds food consists chiefly of vegetable matter: in Greenland shoots of *Eriophorum*, *Ranunculus* and *Cerastium* (H. C. Hart); in Spitsbergen remains of *Fucus* and moss, grasses, stalks and leaves of *Oxyria digyna*, saxifrages and other phanerogams (O. Le Roi), while Römer and Schaudinn found Mollusca (mussels) in stomachs as well as grasses and plants. Young fed on grasses and *Oxyria*. In winter-quarters, some *Zostera marina*, but chiefly *Enteromorpha* sp. (J. W. Campbell). Many food records not assignable to either race definitely. *F.C.R.J.*

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[1] Whether the pale western Brent Goose can be properly separated from birds breeding farther east has long been a matter of dispute. The question has been fully discussed by F. C. R. Jourdain (*Brit. B.*, xviii, pp. 49–52), and Dr. E. Lönnberg has given a considered opinion on the names applicable to the two races (*op. cit.*, pp. 135–138). Of the pale-breasted bird a fair number of skins from breeding-quarters is available, but unfortunately the material in this country of the dark race from breeding-grounds is entirely inadequate and the distinctions of the two birds can only be given from descriptions and by a comparison of migrants—an unsatisfactory procedure. *H.F.W.*

**Distribution.**—*England.*—As in Dark-breasted Brent Goose (*q.v.*), both forms occurring, but Pale scarce on parts of E. coast. *Scotland.*—Main haunts of this form Ayrshire (all Pale, J. Berry), Islay (form not stated), Harris, N. and S. Uist and Benbecula (apparently all Pale, J. W. Campbell), Moray and Cromarty Firths, and fewer Dornoch Firth (all Pale, J. G. Millais). *Ireland.*—Loughs Foyle and Strangford, and Sligo, almost all Pale-breasted, Dark form appearing only late in season (P. Scott). Pale form probably predominates in other parts. *H.F.W.*

**Distribution Abroad.**—Breeds in Spitsbergen, N.E. and N.W. Greenland and arctic E. Canada (N. Ellesmere and Axel Heiberg Is.). Perhaps also Franz Josef Land (*cf.* G. Gorbunov (*Trans. Arctic Inst.*, iv)). On passage Bear Is., Iceland, Færoes. Winters south to English Channel, also Holland, Germany, Denmark. Accidental S. Norway. In America winters on Atlantic coast from New Jersey to N. Carolina, rarely south to Florida and in small numbers on Pacific coast from British Columbia southward. Casual inland and in Barbados. (Possibly some accidental records from Mediterranean region refer to this race.) *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER.—Like typical form but feathers of *mantle* and *scapulars* more broadly tipped pale brown or brownish-white; *under-parts* varying, but paler than typical and much paler than dark examples of typical form, upper-breast, flanks and sides brown or pale brown, feathers tipped whitish, middle of breast whiter and lower breast white. This plumage is acquired by complete moult (wings in full moult, July 13, 17, Aug. 11). SUMMER.—As winter, but when much worn *upper-parts* become browner and *under-parts* show more brown by loss of white tips to feathers.

NESTLING.—Upper-parts and sides of body mouse-grey; centre part of crown darker; patch on lores and narrow line round and behind eye dark sepia; indistinct whitish spots at back and at tip of wing and on body below wing; sides of crown and neck and under-parts pale grey (varying in shade), chin and patch across upper-breast usually white; base of down on under-parts grey brown (from Canadian and Spitsbergen specimens).

JUVENILE.—Differs from adult as in typical form, but under-parts are not noticeably different from those of adult.

MEASUREMENTS.—Not apparently differing from typical form. Breeding examples from Spitsbergen, both sexes, measure: wing 335–357 mm., tail 110–125, tarsus 60–62, bill from feathers 34–38 (9 measured). *H.F.W.*

*PLATES 77a and 79a.*

## 314. THE CANADA GOOSE—Branta canadensis canadensis (L.)[1]

ANAS CANADENSIS Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—"Habitat in Canada").[2]
*Bernicla canadensis* (Linnæus), Yarrell, iv, p. 295; Saunders (in text), p. 412.
*Branta canadensis canadensis* (L.), Pract. Handb. (in note), ii, p. 258.

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[1] Although this species was not admitted to the British list in *A Practical Handbook* it seems reasonable to do so as it has for many years lived in a feral state in many parts of the country.

[2] Linnæus's first reference is to Willughby's *Ornithology* and this author describes the bird from the King's wildfowl in St. James's Park. It is therefore clear that the first birds introduced to this country were of the typical form. This species has, however, been split into a number of races and later introductions may have been referable to one or more of these. It has even been proposed quite recently (W. E. Clyde Todd, *Auk*, 1938, pp. 661–2) that the typical race should be restricted to the St. Lawrence valley and Atlantic coast and that birds from the east coast of Hudson Bay should be treated as a distinct race (*B. c. interior*). *H.F.W.*

**Habitat.**—In Brit. Is. frequents grasslands and marshes in vicinity of lakes, meres and fresh-water pools, sometimes in parkland or well timbered localities. In native country frequents swamps and neighbourhood of lakes and ponds in forested regions, but also in prairie and open country and in cultivated districts, and in winter-quarters resorts to marshes, grasslands, neighbourhood of lakes, ponds and lagoons, grain and stubble-fields, saltings, etc., as well as to seashore and tidal flats. *B.W.T.*

**Field-characters and General Habits.**—A *large grey-brown goose with black head and neck and sharply defined white patch extending from chin up sides of head behind eye.* Wings and upper-parts dark brown, flanks and sides paler brown, with light edgings to feathers in both cases, breast whitish, upper and under tail-coverts pure white, tail black. Bill and legs blackish. Sometimes confused by novices with Barnacle-Goose. Barnacle, however, is not only much smaller, but has parts which are brown in Canada Goose grey, whole face white, and breast as well as neck black, while habits are different, Barnacle being a bird of sea-coast, while Canada, though found on coast in some localities, chiefly frequents fresh waters and marshes, often far inland. Total length *c.* 36–40 ins. ; body *c.* 21–24 ins.

Flight much as grey geese, with measured, regular wing-beats, but achieving a considerable speed. On short flights does not adopt any definite formation, but on longer ones travels in usual V-formation of geese or sometimes in oblique lines or single file. Gait a walk, like other geese, and when flightless owing to moult can run fast. If necessary when moulting or wounded can dive well. In America occasionally nests in trees (see " Breeding "). Strongly gregarious outside breeding-season, associating in this country in flocks of half-a-dozen or so to two or three hundred according to locality. Feeding-habits as grey geese ; gets bulk of food by grazing on grasslands, but during breeding-season (Yorkshire) more aquatic in feeding-habits than at other times (J. C. S. Ellis). Feeds in water by dipping head and even " up-ending " like ducks or swans. Normally a day feeder, but where much persecuted (in America) feeds at night. In Britain birds are in some localities fairly sedentary, in others they wander a good deal from one water to another, and in some cases, even of rather isolated colonies, may be absent from " home " for considerable periods in winter. In America it is stated rarely to associate with other species, but in Britain sometimes joins or is joined by grey geese. So far as information is available the British birds appear generally to resort for roosting purposes to the shores or islands of lakes and other fresh waters. *B.W.T.*

**Voice.**—A loud, resonant trumpet-like " ah-honk " or " aahonk." The " h " is a break like the break in a yodeller's voice. The second syllable is much higher than the first (P. Scott). *B.W.T.*

**Display and Posturing.**—Sexual behaviour very like that of grey geese. The " celebration " after paired gander has driven off an intruder (*cf.* Grey Lag, p. 182) is accompanied by peculiar snaky movements of neck by both sexes. An attitude with neck stretched out on ground (or on water) is assumed, if threatened, by sitting bird, and also on other occasions. " Injury-feigning " by gander recorded by A. C. Bent. *F.C.R.J. & B.W.T.*

**Breeding.**—In Brit. Is. usually nests on islands in ponds or lakes, also on marshy spots, sometimes in colonies of fair size, but usually consisting of a few pairs. *Nest.*—Normally on ground, near water, sheltered by bushes and vegetation, but in a wild state has been known to breed on rocky ledges far from water and at some altitude and also in old nests of birds of prey, such as Osprey. Nest-hollow lined with grasses, dead leaves, bits of reed, etc., down and feathers. Down greyish-brown, with white centres and light tips: sprays large. Feathers uniform light grey, very broad with square tips (G. H. Lings). (See Plate 77A.) *Eggs.*—Usually 5 or 6, 4 to 11 recorded, sometimes 2 to 3 only; ovate or elliptical ovate, white or creamy-white, no gloss. Average of 84 American eggs by A. C. Bent, 85·7×58·2. Max.: 99·5×56 and 87·6×63·6. Min.: 79×56·5 and 86·5×53·5 mm. *Breeding-season.*—Begins early in April; occasionally end of March in Brit. Is. *Incubation.*—By goose only; gander on watch in neighbourhood of nest. Period normally 28–29 days, 30 recorded. *Fledging.*—Young tended by goose, gander in attendance; fully grown at 6 weeks old. Single-brooded. *F.C.R.J.*

**Food.**—In England chief food consists of grass, with some proportion of water-weeds and other aquatic plants. In America, sprouting corn (wheat, barley, oats, etc.) is eaten on spring migration and in high north, berries of preceding year and grass where available. Some animal food also taken in summer, insects, worms, Crustacea, Mollusca, but accurate data lacking. On coast in winter, *Zostera marina*, also *Ulva lactuca* and various other Algæ recorded by A. C. Bent, as well as some animal matter. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Introduced. Known in domestication since Willughby (1678) and described by Latham (1785) as very familiar and breeding freely in many " gentlemen's seats." Now widespread, and as it breeds chiefly on private lakes distribution is local and to great extent artificial, but birds move about after breeding-season and during winter in flocks of variable size and distribution becomes much more general. In *England* widespread but appears scarce or rare in S.W. and most northern counties, as also in *Wales*. In *Scotland* has decreased but is still well established in several parts of Tay and Forth areas, but scarcer in Moray area than formerly and appears scarce or unknown in other parts. *Ireland.*—Has been recorded as breeding (*e.g.* Antrim, Down and Dublin), and occurs occasionally chiefly in E. and S. *H.F.W.*

**Distribution Abroad.**—A Nearctic species, breeding in Alaska, Canada, and northern part of U.S.A. Typical race breeds across Canada, in north from Mackenzie to Labrador and in south to Newfoundland, the Gulf of St. Lawrence, James Bay, S. Dakota, W. Colorado, N. Utah, Oregon and Washington. Replaced by other races on Pacific coast (*B. c. occidentalis*); arctic coasts from Alaska to Southampton Is.; and by two much smaller forms in eastern arctic Canada and N.W. Alaska. Typical race winters from S. British Columbia, northern U.S.A. and in east, S. Ontario and Nova Scotia, south to coasts of Gulf of Mexico. Casual Bermuda and Jamaica (*A.O.U. Check-List*). Has also occurred in Færoes, Norway, Holland, France, etc., but more probably from introduced stock than wild birds. *F.C.R.J.*

**Description.**—ADULT MALE AND FEMALE. WINTER AND SUMMER.—Whole *head* and *neck* glossy black with a broad white band across upper-throat and extending upwards on cheeks, narrowing and ending behind eyes, feathers of chin with brown-black tips and these extend sometimes down centre of throat[1] (in fresh plumage black feathers of head and neck have slight brownish tips); (*rest of upper-parts*) base of neck and upper mantle pale brown, feathers tipped white or whitish; rest of mantle, scapulars and wing-coverts dark grey-brown, feathers narrowly edged brownish-white; back more uniform brown; rump and central upper tail-coverts black, rest of tail-coverts white; (*rest of under-parts*) lower throat, breast and upper belly dull white, feathers having pale brown bases and whitish or whitish-brown edges (usually whiter on lower throat); lower belly, vent and under tail-coverts white; flanks and sides brown, edged brownish-white; axillaries and under wing-coverts brown; *tail* black; *wing-feathers* sepia; *primaries* edged blackish at tips. This plumage is acquired by complete moult (wings in full moult July).

NESTLING.—Centre of crown and centre of back of neck, thin line through lores and eye, and whole upper-parts greenish-sepia (tips of down greenish-gold); fore-head, sides of head and neck, patches on front and hinder part of wing, and on body below wing, and whole under-parts from greenish-gold to greenish-yellow. Bill dark blue-grey, legs and feet blue-grey, iris pale blue-grey. (Specimens from Southampton Is. (=*B. c. hutchinsi*) ex T. H. Manning coll. described.)

JUVENILE.—Very similar to adult except for narrower and more pointed wing- and tail-feathers (and narrower and not such stiff breast-feathers), upper tail-coverts with some brown at tips.

MEASUREMENTS AND STRUCTURE.—♂ wing 420–500 mm., tarsus 82–99, culmen 49–55. ♀ wing 405–475, culmen 47–54 (breeding birds of *B. c. canadensis* measured by P. A. Taverner[2]). (A Dorset specimen measures wing 500, tarsus 98, bill from feathers 59.) Primaries: 1st narrow, pointed and more than half longest primary-covert, 3rd longest, 2nd 3–12 mm. shorter (rarely equal), 4th 3–8 shorter, 5th 27–34 shorter, 6th 62–75 shorter; 3rd to 5th emarginated outer webs, 2nd abruptly emarginated inner web. Longest innermost secondaries above 6th primary. Upper tail-coverts extend to about half, and under to about three-fourths length of tail. Tail rounded 16–18 feathers. Bill and feathering much as Brent Goose, but bill nearly as long as head. Weight 4 to 14 or even 18 lbs. (Taverner).

SOFT PARTS.—Bill black; legs, feet and webs blackish lead-colour; iris dark brown.
*H.F.W.*

**Characters and allied forms.**—Large size, black head and neck with white band across throat to ear-coverts distinguish it from other species on British list, Brent being smaller with no white on throat and black extending on to breast and mantle, and Barnacle having white fore-head, still more extensive black, and barred wing-coverts. A good many forms have been separated. *B. c. hutchinsi* (Melville Penin., Southampton Is. and Baffin Ld.) is small with pale under-parts, *B. c. leucopareia* (=*hutchinsi* auct.) (Hudson Bay to Alaska) is pale and intermediate in size, *B. c. occidentalis* (Q. Charlotte Is., Brit. Columbia, coast S.E. Alaska) is large with very dark under-parts, *B. c. minima* ("Cackling Goose") (coast N.W. Alaska, Aleutian Is.) is small with dark under-parts and cinnamon-tinged breast, *B. c. interior* (E. coast Hudson Bay) has also been separated as being darker than typical *canadensis*. *H.F.W.*

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[1] There is sometimes a definite black line down throat dividing the white. According to Mr. P. A. Taverner this is individual and has no racial significance, but is of less common occurrence in *B. c. canadensis* than in some other races and is usually best developed in males. *H.F.W.*

[2] See "Study of *Branta canadensis*," *Ann. Report, 1929, Nat. Mus. Canada*, No. 67, 1931.

[NOTE.—THE BLACK BRENT GOOSE, *Branta bernicla nigricans* (Lawr.), a very dark form both on upper- and under-parts, which breeds on the Arctic coast and islands of western N. America and in arctic Siberia from Lena eastwards, was stated by the late F. Coburn to have been taken in Staffs, Nov., 1895, Warwick, Nov., 1897, and Norfolk, Feb., 1902, Jan., 1907, and Jan., 1909 (Gurney, *Zool.*, 1908, pp. 121–3, 1910, p. 123, Coburn, *Rep. and Trans. N. Staffs F. Club*, xliv, pp. 121–5), but these birds were wrongly identified ; three of them from Norfolk, Jan., 1909, when examined were found to be *B. bernicla bernicla* (*Brit. B.*, xxii, pp. 91–3).]

[NOTE.—Examples of the introduced EGYPTIAN GOOSE, *Chenalopex ægyptiacus* (L.), an inhabitant of Africa and Palestine, may be met with regularly in some districts, *e.g.* Norfolk, where they breed in a semi-wild condition on ornamental waters, and frequently wander to other parts of the country.]

[NOTE.—Examples, undoubtedly introduced, of the SPUR-WINGED GOOSE, *Plectropterus gambensis* (L.), an inhabitant of tropical Africa, are sometimes reported in this country.]

**General Field-characteristics of Ducks.**—Popular distinction of swans, geese and ducks, though it cannot be maintained in classification, is perfectly valid for field purposes in Europe. Ducks are smaller, shorter-necked, narrower-winged birds than geese and much more aquatic. They fly with neck extended like geese and swans, but the regular wing-beats are considerably more rapid. In contrast to geese and swans sexes are usually conspicuously different in plumage and have quite different notes. The males usually take little or no part in the care of the family. A side-to-side, waggling movement of tail is common and sleeping position is with bill tucked under shoulder feathers. Coition, as in rest of group, is always on water. Sheld-Ducks approach geese in various ways (flight, carriage, largely terrestrial habits, similarity of sexes in plumage, male assisting in care of young) and are thus marked off from other ducks. Their characteristics are fully given under Sheld-Duck, below. Remainder are divisible into *surface-feeding* and *diving ducks.*[1]

SURFACE-FEEDERS (Nos. 317–326) are relatively slenderly built birds and get most of their food in shallow water, securing it from surface or from mud with quick dabbling motion of mandibles (by which water is strained out through lamellæ of bill and solid particles retained) or where water is slightly deeper by " up-ending " with head and front part of body submerged and tail in air, maintaining position by paddling with feet. Young dive fairly freely, but adults only more or less exceptionally or if wounded (see individual species). Though often resting on water, most of them (unlike most diving ducks) come freely to shore for this purpose and walk with ease, carrying body nearly horizontal. They are fond of resting on one leg. Some also feed to varying extent on land. They rise easily and directly off water, not pattering over surface like most diving ducks, and fly with considerably less rapid wing-beats. Like rest of order they do not glide in ordinary flight, but when preparing to pitch they descend in a long slanting glide, finally braking and dropping to water with neck craned forward, but body hanging down so that they strike the surface feet first. All ducks rise and pitch into the wind whenever possible. In pitching wind resistance helps to counteract bird's own momentum and on still days " back pedalling " action of wings is noticeable. There is generally a conspicuously coloured patch, the " speculum," often with metallic gloss, on the secondaries, often duller in female than male, and this is frequently helpful in identification. About mid-summer the male in European species assumes a plumage, the " eclipse," resembling the female's, though he retains his characteristic wing-plumage. This is replaced by the full plumage, which is assumed in early autumn in some species, in others not till much later. The female's " eclipse," which is assumed some weeks later when the young are well-grown, scarcely differs from the plumage it replaces and can be ignored for field purposes.

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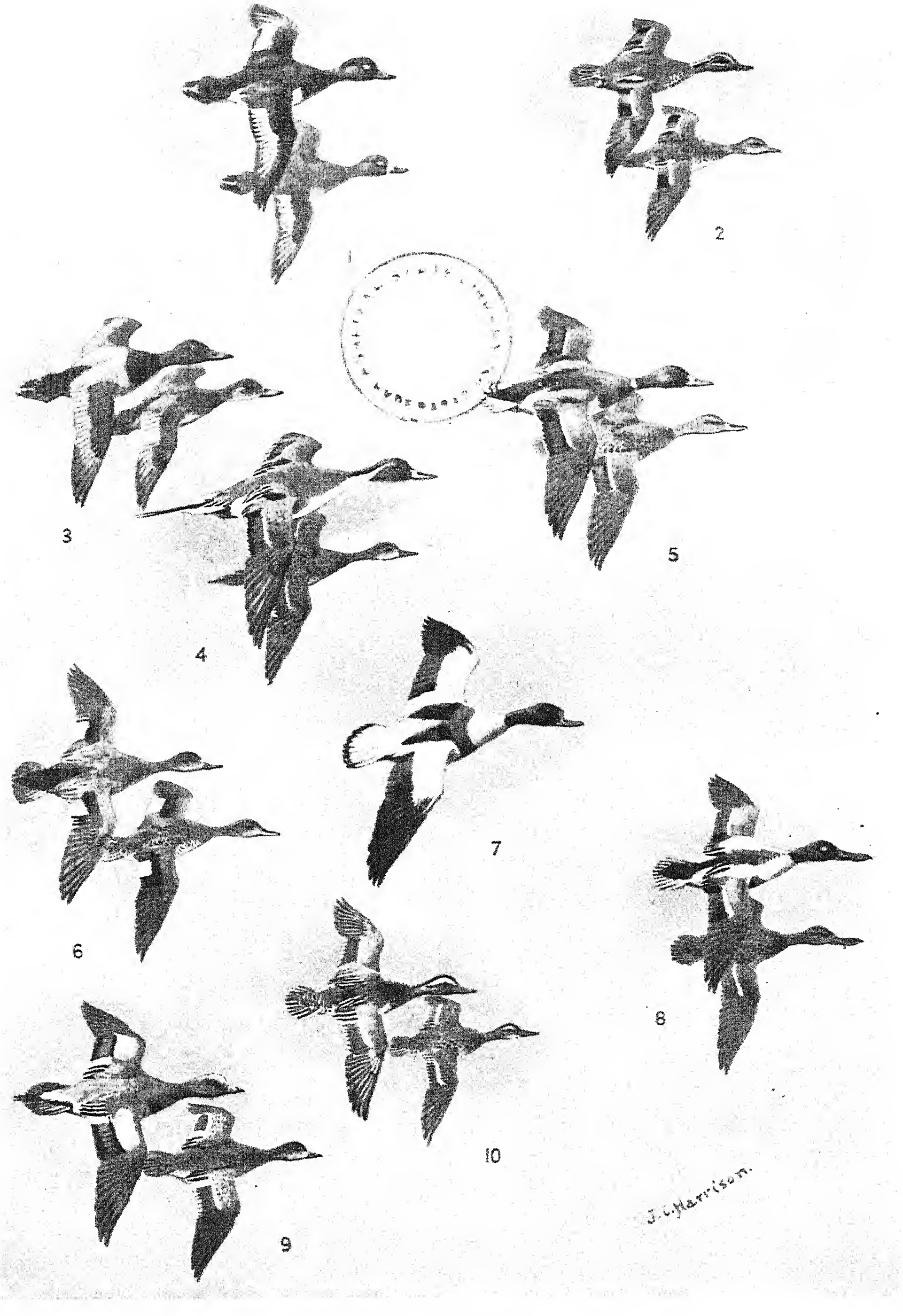
[1] Some species, more particularly of the diving ducks (including *Mergus*), show a more or less marked preponderance of adult males over females and immature birds, either generally or in certain areas. In some cases there is good evidence that the old drakes do not migrate so far south as the females and young, the former far outnumbering the latter in the north of the winter range, while in the south the reverse is the case. In others the situation is evidently considerably more complex and is little understood. Brief statements in this connexion are given under the several species so far as the available data permit, but it must be stressed that in nearly all cases the recorded information is extremely inadequate, and the whole subject merits further attention. *B.W.T.*

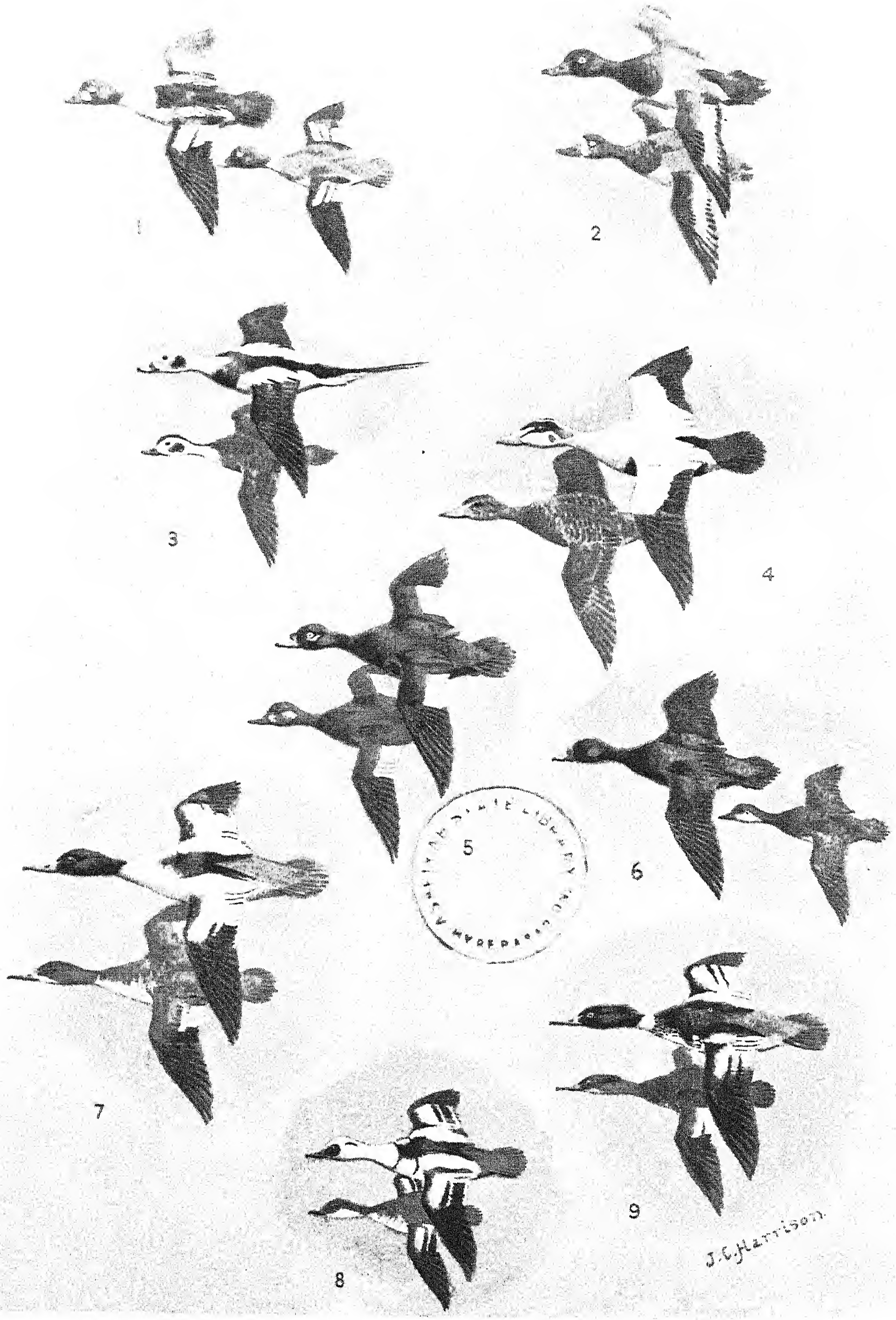
DIVING DUCKS are again divided into typical divers and the very distinct " saw-bills " (*Mergus*). Former (Nos. 327–341) are typically shorter-bodied, more stocky birds than surface-feeders, with legs set far back. They walk clumsily with an upright carriage and except for breeding purposes do not come much to land. With certain exceptions they like open waters and are indifferent to cover, and a number are purely marine in winter. With exception of Golden-eye and Buffel-headed, they rise from water with more or less effort, pattering along surface before getting under way, and alight more awkwardly. The wings are broad and tend to narrow more abruptly to a point than in surface-feeders, while in flight wing-action is more rapid and thicker neck often noticeable and feet stick out beyond tail. The eclipse tends to be less marked, though striking enough in some, *e.g.* eiders, and there is not generally a distinct speculum, though white patches and bars on wings are frequent. They habitually dive for their food and " up-end " only rarely or not at all.

SAW-BILLS (Nos. 342–345) are recognized by their slender, tapering and (except in Smew) rather long bills, generally slender build, and more or less distinct crested or mane-like development of feathers at back of head. The outline in flight is characteristic, with head and slender neck held stiffly in straight line with the body, giving characteristic elongated appearance (other ducks fly with head held slightly bent downwards on neck). Typical flight formation of flocks is strung out in oblique lines or with only slight bunching in centre. When travelling a distance an angled or truncated V formation may be adopted. They dive for their prey and are primarily fish-eaters. They are more graceful, lively birds than the typical diving ducks, come to land more and walk better. By inexperienced observers they are sometimes confused with grebes (*cf.* p. 374). *B.W.T.*

**British Distribution of Ducks.**—The influence of introductions on the distribution of ducks, both as breeding-birds and as casual visitors, is important. In many places various species of ducks have been put down in a full-winged state or pinioned birds have bred and their young have been allowed to fly freely, so that while in some cases it is certain that birds breeding or occurring in an apparently truly wild state have in reality been the result of such introductions, in other cases it is impossible to say whether they are truly wild or not. This is the more unfortunate because a good many species are certainly extending their breeding range in a natural way and the added effect of introductions cannot be traced with exactitude. *H.F.W.*



Adult Males and Females of :
1, Tufted Duck. 2, Teal. 3, Pochard. 4, Pintail. 5, Mallard. 6, Gadwall.
7, Sheld-Duck (male). 8, Shoveler. 9, Wigeon. 10, Garganey.



Adult Males and Females of
1, Goldeneye. 2, Scaup. 3, Long-tailed Duck. 4, Common Eider. 5, Velvet-Scoter.
6, Common Scoter. 7, Goosander. 8, S 9, R

## **Genus TADORNA** Boie [1]

TADORNA Boie, Tagebuch Reise Norwegen, p. 351 (before May 1822—Monotype: *Tadorna familiaris*—*Anas tadorna* L.).

Bill rather concave, " nail " narrow, sharply bent down and recurved over lower mandible, old male in breeding-season with prominent knob at base of bill. At bend of wing a conspicuous horny knob. Large green speculum, inner secondaries chestnut-rufous. Tail slightly rounded, 14 rectrices. Third primary longest. Sexes nearly alike. One species, but if *radjah* from Papuan Islands and Australia is not generically separated two.

*PLATES 79a, 80 and 85a.*

## 315. THE SHELD-DUCK—Tadorna tadorna (L.)

ANAS TADORNA Linnæus, Syst. Nat., ed. x, i, p. 122 (1758—Coasts of Europe. Restricted typical locality: Sweden).
*Tadorna cornuta* (S. G. Gmelin), Yarrell, iv, p. 352; Saunders, p. 419.
*Tadorna tadorna* (L.), Pract. Handb., ii, p. 258.

**Habitat.**—Chiefly low-lying sandy and muddy coasts and estuaries and vicinity of coastal sand-dunes, warrens, etc., but locally resorts for breeding purposes to rough, brambly ground above cliffs and locally also to lake borders, heaths, warrens, and even ordinary agricultural country some miles inland. Also on inland salt-lakes in Asia. Outside breeding-season occasional on inland waters, but never in large numbers. *B.W.T.*

**Field-characters and General Habits.**—A large duck with goose-like pose and carriage and *boldly contrasted plumage pattern of black, white and chestnut*, while at close quarters *bright red bill* and pink feet are also conspicuous. Head and neck black with metallic-green lustre, scapulars, primaries and tips of tail-feathers black, broad chestnut band round fore-part of body, dusky band down centre of belly, speculum metallic-green bordered above (in closed wing) by chestnut, rest white with under tail-coverts tinted chestnut. Chestnut band conspicuous as such at fairly close range, but birds tend to appear black and white at longer distances. Plumage of sexes practically the same; female merely a little duller, but lacks knob at base of bill which is conspicuous in drake. Both sexes have rather duller plumage corresponding to " eclipse " of other ducks, showing white about face and throat and with pectoral band much obscured. Full plumage from Oct. or later to July. Juveniles have dark grey-brown upper-parts and head, with face and throat white, and lack chestnut girdle; bill flesh-colour, legs livid grey. Total length *c.* 24 ins.; body *c.* 16 ins. Downy young marbled dark brown and white.

Flight slower than typical ducks, with relatively slow wing-beats, more like goose; rises easily. Flocks travelling for any distance usually do so in wedge formation or oblique lines. Walks with ease and sometimes runs. In breeding-season, when nesting above cliffs, birds perch quite freely on ledges and outstanding rocks of cliff-face. Swims buoyantly and often rests on sea, but is less aquatic than most ducks and seldom goes far out.

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[1] Boie's *Tagebuch* is referred to in an article by him in *Isis*, No. 5 (May), 1822, col. 562. *Tadorna* Fleming, *Philosophy of Zoology* was published in the same year, but as it was entered at Stationers' Hall on June 28 it must have been published subsequent to that date in order to comply with the law of copyright at that time. It is therefore clear that Boie's *Tagebuch* antedates both his article in the *Isis* and Fleming.

Thoroughly gregarious, seldom seen singly except in case of stragglers inland; hundreds are present on suitable bits of coast, but birds are inclined to split up into smaller flocks and groups; gatherings of presumably non-breeding birds may be seen on coast even in summer. Both duck and drake remain with young and often several broods join up in charge of one pair. Hours of feeding mainly determined by tides; feeds chiefly on the ebb, wading in shallow water, but will feed with head and neck under water and sometimes even " up-end " like Mallard. Habit of stamping in shallows or on wet sand to bring up worms has been frequently remarked. Between tides birds generally rest on shore, dunes, or coastal pastures. Young dive freely, but adults only when wounded or much alarmed and at coition. Intention to take flight marked by raising head high and moving it rapidly to and fro with accompanying calls (O. Heinroth). *B.W.T.*

**Voice.**—In general a rather silent bird, though noisy at breeding-places where many nest. A running " ak-ak-ak - - -," a harsh chattering quack, is often heard from flocks feeding at night as well as by day, and this is regular note of female. It is used both when settled and in flight, and when delivered rapidly may have a kind of trilling effect. A harsher " ark-ark - - -" of anger or excitement is, according to H. Boase, common to both sexes and both utter subdued chuckling " quack " when brood is in danger (C. Oldham). An almost whistling anxiety call of female to young is also described (F. W. Dewhurst). Spring display-note of male is low, clear whistling " wee-o͞o " or " wh'chee-o͞o " and male has also a deep " kow, kow." O. Heinroth describes a note " *rō*-ow, *rō*-ow " as incitement note of female (see under " Display "), and Boase records highly peculiar variant of the " ak-ak - - -" trill recalling notes of flock of Linnets and " running in waves from silence to silence." A single hoarse "waak" is sometimes heard in flight; also hisses. *B.W.T.*

**Display and Posturing.**—Display postures, considerably varied, have been described by H. Boase (*Brit. B.*, xxviii, pp. 218–22). (1) " Rest-intent " attitude when excitement is rising; head held higher and neck less curved than normally, nape-feathers raised. (2) " Salute," apparently directed to other males rather than females, only or chiefly in early spring; swimming bird extends neck rather stiffly upwards and swings bill upwards till head and neck are in line and down again; may be repeated up to three times with intervals of a few seconds. (3) Head and neck extended in line at steep angle upwards, sharply retracted after moment's pause, with upward swing of stern, and return to normal. (4) " Bow "; head swung upward and backward with bill held normal to neck and in its furthest position not rising more than 30°—following through in a forward and downward motion, accompanied by whistle; follows the last and other similar forms and is also greeting ceremony of male to female. Has variant reduced to nodding to and fro of head. (5) With bill pointing downward bird rises on water with arched neck, raises head and neck with upward swing till neck fully extended and bill pointed upwards at about 60°, then subsides; sometimes followed by 2, performed usually three times. (6) Rapid forward and backward motion of head, neck being extended at *c.* 45° and then retracted—done with such energy as to produce upward swing of tail—quick recovery with bill, head and neck extended in vertical line, bill brought horizontal once more and tossed once or twice, and return to normal; very rapid. Sometimes only upward and forward swing, repeated with such energy as to cause bird to rise on water as head swings back. Variant observed in dispute between two pairs. (7) Greeting ceremony of female in response to 4; bird holds head and neck in horizontal line well below level of back and makes scooping motion with bill, with accompanying "ak-ak-ak" note. Also apparently used as true display attitude by unmated females. Drake may also use it when approaching female and when she responds changes at once to 4, which appears peculiar to male sex. Menacing posture (both sexes) is like 7 without scooping action, or head and neck may be swung up and down with or without accompanying sideways swing, which may be also used alone. H. Wormald notes association of trilling whistle with posture 5 (when head reaches highest point) and of continued whistling with posture 6. Paired female incites male to attack intruders, much as in geese, using special note. Displays often occur amongst a number of birds together, but communal gatherings continue far into breeding-season.

As preliminary to coition head-dipping as in geese and swans occurs only sporadically. Instead it is usual to submerge completely, both birds generally diving together, male getting on to female's back while still under water and holding on to her nape-feathers with bill (O. Heinroth). "Injury-feigning" occasionally recorded. *F.C.R.J. & B.W.T.*

**Breeding.**—Most breeding-sites in neighbourhood of extensive mud-flats, at low tide, but occasionally also at considerable distances inland, generally near open water. *Nest.*—Usually in rabbit-hole or burrow among sand-dunes or downs: also under furze or bramble bushes, in stone-dykes, under rocks or hedges, occasionally almost in the open, among heather, and even in hollow trees. When in a burrow nest may be 7 or 8 ft. from entrance or more. Nest itself consists almost entirely of pale grey down with slight brownish tinge, with large sprays, no white centres, with mottled appearance in bulk, and dark brown-tipped feathers (more rarely chestnut) as well as some greyish (see Plate 85A), also some marram grass, etc. *Eggs.*—Normally about 8–15 or 16, but up to 20 recorded, but larger numbers such as 28 and 32 evidently due to more than one female: shape rounded oval, creamy-white, strong shell, little gloss. Average of 100 British eggs, 65·81×47·59. Max.: 70·5×48·1 and 68×50. Min.: 61·1×48 and 64·6×44·6 mm. Average weight, 7·17 grams (8·6 to 5·7 gr., H. Goebel). *Breeding-season.*—Exceptionally latter half of April, usually from beginning of May, some not till late in month. *Incubation.*—By female only, leaving to feed twice daily, called off by male, who remains in neighbourhood. Period usually 28–28½ days: 30 recorded. *Fledging.*—Young led from nest to water by female alone or by both parents, female leading and male following. At first tended by parents, but where several pairs breed, broods unite to form packs with one pair of adults in attendance. Period about 8 weeks. Single-brooded. *F.C.R.J.*

**Food.**—Chiefly marine Mollusca (including *Buccinum, Littorina, Cingula, Skenea, Paludina, Cardium edule, Tellina balthica, Montacuta purpurea,* etc.): small Crustacea (small crabs, sandhoppers, shrimps, and prawns): occasionally insects (Coleoptera (*Carabus nitens*): Diptera (larvæ of *Eristalis*), etc.): small fish and fish-spawn and Annelida (*Nereidæ* and lug-worms (*Arenicola*)). Also vegetable matter (Algæ, grasses (*Gramineæ*), seeds, roots of aquatic plants, etc.). *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident. Generally distributed suitable localities on coast, and especially estuaries, and in some places breeds considerable distance inland. Now breeds Shetland, where previously very rare visitor. Has increased in many parts. Occurs inland in very small numbers (Thames valley, Cambs, and midlands regularly; twice in large numbers over Cheshire in July). *H.F.W.*

**Migrations.**—*British Isles.*—In some breeding-areas appears to be resident, haunting same stretch of coast or estuary throughout year. In others summer-resident only, arriving mid-Feb. or early Mar. and leaving mid-July or Aug. Occurs elsewhere, including inland waters, as passage-migrant (but whether, or to what extent, of British or continental origin is doubtful) Feb. to mid-May and mid-July to Sept. and as winter-visitor Sept. onwards according to weather conditions. Inland waters also visited summer months by non-breeders. Some British-bred birds (ringed in Hants, Dumfries, and Fife) migrate across N. Sea to German coast between Aug. and Oct. Two adults ringed same coast Sept. and recovered Norfolk following Jan. and Lancs June, may have been British birds that had already thus migrated. *N.F.T.*

**Distribution Abroad.**—Palæarctic. In Europe breeds north to 69° in Norway, Sweden, Åland Is., S.W. Finland, Baltic states, and S.E. Russia (Caspian Sea). Also Transcaspia, Aralo-Caspian region, S.W. Siberia, Semipalatinsk, Zaissan, N.W. Mongolia, and east to Manchuria. In south to N. France, S. Spain ?, Sardinia, Greece, Bulgaria, Romania, Crimea, and Caucasia. Also in Asia Minor (?), Iraq, Persia, Turkestan, etc. Has occurred Iceland and Færoes: Madeira, coasts and islands of W. Mediterranean from Strait of Gibraltar to Malta (rare), also Cyprus, Egypt, Palestine, E. Russia, Baluchistan, N. India, S. China, Burma, Formosa, Japan, etc. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—*Head* and *neck* all round dull green, in some lights tinged amethyst; chin and throat sometimes dull blackish-green; small white mark below eye; extreme point of chin sometimes white, lower-neck white; (*upper-parts*) broad tawny band across upper-mantle extending on to breast (sometimes feathers bordering lower-mantle vermiculated brown-black); scapulars mostly black glossed dull green, when fresh faintly edged whitish, many with one web more or less white, remainder entirely white, some with black-brown vermiculations; rest of upper-parts white (upper tail-coverts sometimes tipped black-brown); (*under-parts*) lower-neck and upper-breast white; across breast a broad band, tawny at sides merging into black in centre, black continued down centre of breast to vent as a broad band varying in breadth individually and widening out on belly, feathers all with broad white bases and when fresh narrowly tipped brownish; under tail-coverts mostly cinnamon-rufous, some white; rest of under-parts white; *tail* white broadly tipped black, outer feathers more or less white; *primaries:* rudimentary first white tipped black, remainder black, inner webs black-brown, outer ones with bases white; *secondaries* black-brown, outer webs glossed metallic-green forming green *speculum,* inner webs with basal halves white, inner secondaries sometimes faintly tipped white, innermost white with outer web chestnut, merging into black or hair-brown towards tip or shaft of feather, remainder white with outer web usually edged black; primary-coverts black; *bastard-wing* white tipped black and more or less black on outer webs; rest of *wing-coverts* white. This plumage is acquired by a body moult Aug. to Dec. In summer vermiculated tips of chestnut mantle-feathers mostly lost by abrasion.

ADULT MALE. ECLIPSE.—Most body-feathers, not all those of mantle and scapulars, not back, rump nor all upper or under tail-coverts, are first moulted, followed by wings and tail July and Aug. (*Head* and *neck*) crown, sides of face, and sides of neck blackish, feathers tipped dark green and faintly edged dusky-brown, those at base of upper mandible and cheeks with whitish bases more or less exposed; whitish patch below eye as in winter; chin and throat brown-black, feathers with conspicuous white bases and narrowly edged white at tip; (*upper-parts*) new feathers of mantle tawny with broad blackish tips, more or less vermiculated blackish towards base and with faint white terminal lines; scapulars much as winter; new upper tail-coverts white with blackish tips; (*under-parts*) feathers of sides of upper-breast pale tawny with ill-concealed broad white bases and narrowly edged white, some more or less shaded blackish towards tip, those of centre of breast-band white with brown-black tips, more or less suffused tawny and narrowly tipped white; feathers of band down centre of breast and belly white, tipped pale tawny more or less marked blackish, these tips narrower on belly and almost disappearing on vent which is white; feathers of sides of belly and flanks white, tips faintly speckled blackish; new under tail-coverts light ochraceous-buff; *tail* and *wings* as winter.

ADULT FEMALE. ECLIPSE.—Like adult male eclipse but *head* browner, new feathers of *upper-mantle* dark ash-grey indistinctly vermiculated pale tawny and whitish and faintly tipped whitish; tawny patch at sides of *upper-breast* merely indicated; centre of breast and belly practically white; new flank-feathers with faint terminal dusky lines. *Tail* and *wings* as winter.

ADULT FEMALE. WINTER AND SUMMER.—As male, but *head* and *neck* usually duller, but sometimes as brilliant as male; in some fore-head and lores more or less white; feathers round base of bill and lores brownish (sometimes feathers of chin, fore-neck and sides of neck faintly tipped white); (*upper-parts*) most feathers of tawny band on mantle vermiculated black towards tip and narrowly tipped black or white (becoming lost by abrasion); (*under-parts*) tawny breast-band narrower, feathers in some vermiculated black; black of breast and belly not so intense as in male and area less extensive, feathers with broader white bases imperfectly concealed; under tail-coverts pale cinnamon-rufous, long ones white. Moult as in male.

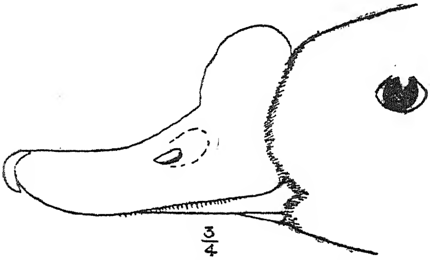
NESTLING.—Fore-head, lores, cheeks and narrow eye-stripe (in some absent) white; a very small dark spot on side of head below and behind eye; crown, centre of nape and of upper-mantle, mantle, broad bar on wing, centre of back and rump and patch on back of thighs extending to sides of rump, sooty-brown or light chocolate-brown; small patch in centre of mantle (in some ill-defined) and irregular streak on sides of back and rump white; under-parts white.

JUVENILE. MALE AND FEMALE.—Easily distinguished from adults by absence of tawny and black coloration. (*Head* and *neck*) fore-head and lores almost to eye white; crown black, feathers narrowly tipped buff-brown; nape, cheeks and sides of neck black, feathers with very narrow white tips; line above and patch below eye white; (*upper-parts*) centre of upper-mantle pale hair-brown, feathers with imperfectly concealed white bases; sides of upper-mantle more or less white; mantle hair-brown, feathers narrowly edged white, some white and some vermiculated hair-brown and washed ochraceous-buff; scapulars hair-brown merging into buff-brown at edges, lower scapulars mouse-grey; lower-back, rump and upper tail-coverts white, latter vermiculated brown-grey towards tips; (*under-parts*) chin and patch from lores to below eye white; fore-neck white, feathers mostly tipped dusky-brown; remaining under-parts white but sometimes sides of upper-breast tinged buff and flanks suffused pale drab; *tail* black-brown edged and tipped buff-white, outer feathers more or less white; *wing* as adult, but *primaries* narrowly edged white, 7th and succeeding with broad white tips, *secondaries* rather less brilliantly glossed green and broadly tipped white, inner webs largely white, inner secondaries mouse-grey with chestnut outer webs, innermost as lower scapulars; *bastard-wing* black-brown tipped white; *greater coverts* mouse-grey; *median coverts* white tipped mouse-grey, upper series only faintly tipped as are *lesser coverts*.

FIRST WINTER AND SUMMER. MALE.—As adult male but green of *head* and *neck* usually duller; (*upper-parts*) some feathers of tawny band on mantle faintly tipped black-brown edged white (edges soon lost by abrasion); retained juvenile lower-scapulars mouse-grey (not white as in adult); (*under-parts*) tawny band on breast narrower, feathers of centre of breast-band white tipped dull black and faintly edged pink-cinnamon; black area down centre of breast and belly narrower and duller than in adult, most feathers with imperfectly concealed broad white bases and dull black tips often suffused and tipped pink-cinnamon; under tail-coverts pale cinnamon-rufous; *wing* as juvenile, but new innermost secondaries and wing-coverts as adult, mouse-grey tips to *median* and *lesser coverts* more or less abraded (easily distinguished from adult by white tips to *inner primaries* and *secondaries* and mouse-grey *greater coverts*). The juvenile body-feathers, tail, some innermost secondaries and coverts, sometimes some greater and median coverts are moulted Aug. to March, but not rest of wings. *N.B.*—Sometimes moult is incomplete and prolonged, many juvenile feathers being retained, in others breast and belly-band is as black and fully developed as in adult male.

FIRST WINTER. FEMALE.—As adult female but feathers of *head* and *neck* mostly with dusky-brown tips, in some a patch of white tipped dusky on cheek below eye; white bases to feathers of *throat* often conspicuous, giving mottled appearance; tawny band on *mantle* and *breast* sometimes narrower, black band down breast more profusely washed light pink-cinnamon and more intermixed with white, sometimes *breast* and *belly-band* only imperfectly indicated, sides of breast being pale brownish-tawny, feathers speckled or shaded black-brown towards tip and with broad white bases; rest of breast-band and belly-band white, feathers mostly broadly tipped sandy-black-brown or black-brown; *wing* as juvenile but new innermost secondaries and coverts as adult. Moult as male. No spring material examined.

MEASUREMENTS AND STRUCTURE.—♂ wing 318–350 mm.; tail 100–123, tarsus 50–57, bill from feathers 52·5–60 (12 measured). ♀ wing 290–334, bill 44–54. Primaries: 1st narrow, pointed and more than half longest primary-covert, 3rd longest, 2nd 3–9 mm. shorter, 4th 10–18 shorter, 5th 20–32 shorter, 6th 42–55 shorter; 2nd emarginated on inner and 3rd on outer web. Innermost secondaries rounded at tip and about equal or shorter than 6th primary. Scapulars short and rounded at tip, in eclipse with square tips. Both sexes with rounded carpal "spur," more prominent in adult male. Tail almost square, only slightly rounded, 14 feathers. Upper tail-coverts almost reach tip of tail. Bill broader towards tip than at base and rather sharply upturned; edges of bill with more or less prominent lamellæ, more developed towards tip of upper mandible; lower mandible with lamellæ not projecting outwardly; male develops in early spring at base of upper mandible a prominent fleshy knob which is shrunken and virtually absent in late summer and autumn and only slightly indicated in 1st summer males.



The Sheld-Duck (*Tadorna tadorna*). Male adult in the breeding-season.

SOFT PARTS.—Bill (ad. ♂) in spring carmine or blood-red, later paler, nail dusky, (ad. ♀) duller, with usually a little black round tip, (juv.) greyish-pink: in ♂ usually becomes uniform pink by Aug., but in ♀ is blackish round tip (H. Wormald); legs and feet (ad.) reddish flesh-colour, (juv.) pale greyish-white; iris brown.

[*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Red upturned bill, green head, large amount of white and chestnut band distinguish adults, while juvenile has upper-parts ash-brown and white and under-parts white. [*A.C.M.*]

## Genus CASARCA Bp.

CASARCA Bonaparte, Comp. List B. Eur. Amer., p. 56 (1838—Monotype *C. rutila*= *ferruginea*).

Much like *Tadorna*, but bill quite different; culmen scarcely concave, nearly straight, nail wider, nearly equal to half width of bill and only bent downwards, not recurved. 4 species, 1 Palæarctic, 1 southern Africa, 1 Australia, 1 New Zealand.

*PLATES 87 and 91.*

## 316. THE RUDDY SHELD-DUCK—Casarca ferruginea (Pall.)

ANAS FERRUGINEA Pallas, Vroeg's Cat., Adumbratiuncula, p. 5 (1764—Tartary).
*Tadorna casarca* (Linnæus), Yarrell, iv, p. 347; Saunders, p. 421.
*Casarca ferruginea* (Pall.), Pract. Handb., ii, p. 263.

**Habitat.**—Though at times seen on sea is much less maritime than Sheld-Duck, in breeding-season frequenting open lakes, lagoons and rivers, or sometimes quite small streams, often in steppe or similar country, as well as up to high elevations in mountains and high plateaux of Asia; even breeds in barren almost waterless mountains in Gobian Altai (H. Grote). In winter-quarters largely frequents sand-banks of larger rivers, but also lakes, lagoons, and other more or less extensive fresh or brackish waters, as well as fields and cultivation, and even desert country during day. *B.W.T.*

**Field-characters and General Habits.**—*Orange-brown coloration, with paler head, black wing-quills and tail and white wing-coverts, which are nearly concealed when at rest but very conspicuous in flight*, are quite distinctive. Size about as Sheld-Duck. Head of male buffish shading gradually to orange-brown on neck; narrow black collar and metallic-green speculum. Female much the same, but head paler, almost whitish, and no collar. Juvenile much as female, but duller, with darker, browner back. Bill blackish, legs dark grey. Total length *c.* 25 ins.; body *c.* 16½ ins. Sometimes confused by novices with the related, so-called Egyptian Goose (*Chenalopex ægyptiacus*), acclimatized in Norfolk and elsewhere and a not uncommon stray from captivity or semi-captivity in other districts. This species has similar wing-pattern, but resemblance is only very superficial, as Egyptian Goose has not the orange tint of Ruddy Sheld-Duck, has chestnut patches round eye and on breast, and pinkish bill and legs, as well as other differences.

Flight strong and fast, but rather heavy, with relatively slow wing-beats. Though swimming well enough, with neck erect, fore-parts low and stern high, spends much of its time on land resting or walking about and grazing like a goose. Walks well with rather erect carriage and can run fast if necessary. Will perch on rocks, walls, and at times even trees. Generally seen in pairs; but on migration these collect in loose flocks (H. Whistler). Largely nocturnal in feeding-habits. Very wary where persecuted, but surprisingly tame where protected. Does not associate much with other species, but will do so with the related Egyptian Goose. Intention to take flight is marked by raising head high and rapidly moving it to and fro with peculiar swinging motion and accompanying calls (O. Heinroth). *B.W.T.*

**Voice.**—Has loud, nasal, honking notes, with a good deal of variation; ordinary form rendered "ah-onk" (H. Whistler), but voices of male and female are distinguishable, former having more "o" and latter more "a" sound according to O. Heinroth, who renders chief call of male as prolonged, loud, rolling "korr," warning as prolonged "hō" and anger-note as "hō-hō," and those of female as "hah-ah" (very loud and nasal), "hah," and a short repeated "rĕrr" respectively. *B.W.T.*

**Display and Posturing.**—Dominant feature in sexual relations, which have been very fully studied in captivity by O. Heinroth (*Verh. d. V Internat. Orn.-Kong., Berlin, 1910*, p. 643), is female's persistent goading of male to attack any bird of same or related species venturing near them. On approach of intruder female makes kind of feigned attack, with neck extended and head close to ground, constantly uttering anger-note, and if it does not withdraw she returns to male, running frantically round him and giving him no peace till he attacks the stranger and if possible drives it off. Male appears to have no courtship, but female takes initiative in attaching herself to a male and inciting him to attack others, though he may or may not respond. Females not yet definitely paired may incite different males against one another, apparently preferring strongest and most bellicose. Preliminaries to coition are same as in other Anseriformes and subsequent behaviour quite goose-like, male remaining short time with elbows raised near female, which generally continues in crouching position. Tendency to stoop in manner almost like birds-of-prey is characteristic; flocks performing evolutions in air will often dive for some distance and glide up again at end like falcons (Heinroth). *F.C.R.J. & B.W.T.*

**Breeding.**—Nests in holes of any kind: in cliffs, among ruins, in burrows, sand-dunes, and it is said even in old eyries of Raptores and in hollow trees. *Nest.*—Consists chiefly of down and feathers, which are whitish, tipped with characteristic foxy-red (see Plate 91), and a little grass, etc.; made by female. *Eggs.*—Usually 8 to 12, but up to 16 recorded; rounded oval, white, with smooth shell and dull gloss. Average of 71 eggs (43 by H. Goebel, 13 by E. Rey), 67·02×47·06. Max.: 72×49 and 68·8×49·5. Min.: 61·5×45·6 and 65×45 mm. Average weight, 7·33 grams (8·1–6·45 gr., E. Rey). *Breeding-season.*—Latter part of May. *Incubation.*—By female alone: male in attendance, but not close by. Period 27–29 days. *Fledging.*—Young tended by both parents. Single-brooded. *F.C.R.J.*

**Food.**—Naturally consists chiefly of vegetable matter, grass, water-weeds, corn and other growing crops where available, but also includes animal matter, small fish, frogs and spawn, worms, Mollusca, Crustacea, and at times even eats offal and dead human bodies in advanced stage of decay (R. Meinertzhagen). *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. Many occurred June to Sept., 1892, various parts Ireland, in Cumberland, Berwick, Sutherland, Morayshire, Lincs, Norfolk, and Suffolk; flocks ten to fifteen and even twenty in some places (*cf.* F. M. Ogilvie, *Zool.*, 1892, pp. 392–8). Others recorded from time to time Somerset, Dorset, Wilts, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Lincs, Pembroke, Cheshire, Stirling, Midlothian, Fife, Perth, Angus, Inverness, Aberdeen, Moray, Caithness, Sule Skerry and Sanday (Orkneys), and elsewhere. Some of these examples had no doubt escaped from captivity, and it is impossible to say in cases of stray birds which were genuine wild ones. *H.F.W.*

**Distribution Abroad.**—S. Palæarctic region. Breeds from S. Spain, Marocco, Algeria, Tunisia, Egypt (formerly at any rate), Greece, Macedonia, Bulgaria, Romania, Russia (Crimea, Sea of Azov, Ufa Govt., Lower Volga, and Caucasus), Asia Minor, Palestine, Iraq, Persia, Transcaspia, Kirghiz and Kulunda Steppes, Turkestan, Afghanistan, Semipalatinsk, Zaissan, Altai, Tibet, and Mongolia. Winters south to N. African coast and N. Sahara: also S. Arabia, Baluchistan, India, Ceylon, S. China, Formosa, etc. Casual in W. Greenland, Iceland, Færoes, Norway, Sweden, Denmark, Finland, Estonia, Poland, Hungary, S. Russia, Germany, and all countries of S. and W. Europe to the Mediterranean as well as the larger islands, but some records probably due to escapes. Also Japan and eastern U.S.A. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head and crown cream-buff or warm buff, in some fore-head pale cinnamon-rufous, in some dusky patch at back of crown; nape pale cinnamon-rufous shading to deeper on lower-nape; black ring varying in depth individually round lower-throat; mantle cinnamon-rufous; scapulars mostly same but some cinnamon-buff, some vermiculated dusky, some lower ones slate-grey suffused and vermiculated cinnamon-rufous, others with inner webs blackish or pale slate and outer webs pale greyish-white or white; back cinnamon-rufous finely vermiculated black; rump and upper tail-coverts black with dull green gloss; (*sides of head* and *under-parts*) lores and cheeks cream-buff; chin, throat and sides of neck pale cinnamon-rufous; breast, sides of body and flanks cinnamon-rufous; belly and vent chestnut; under tail-coverts cinnamon-rufous (in some chestnut); axillaries and under wing-coverts white; *tail* black glossed green; *primaries* and their coverts black glossed dull green; *secondaries* black-brown, outer webs bright metallic-green (forming green *speculum*) sometimes with magenta-coppery gloss, inner webs mostly white and in some with white tips, innermost secondaries with outer webs cinnamon-rufous, and inner webs more or less grey or white, some short innermost slate-grey; *bastard-wing* black; median and lesser *primary-coverts* black or grey-black, vermiculated light buff or white; *greater, median* and *lesser coverts* white or white washed pink-buff. This plumage is acquired by partial moult Dec. to April involving most body-feathers, central pair of tail-feathers, innermost secondaries and coverts. *N.B.*—Cinnamon-rufous of upper- and under-parts is very variable in shade and becomes much faded in worn plumage.

ADULT MALE. ECLIPSE.—No material with remiges in quill examined. One (♂ ad. 19/7/99 Brit. Mus.) is moulting some feathers of upper- and under-parts, rest of body-plumage and wings worn. One (Sept., Tibet, no sex but apparently ♂) has wings, tail and much body-plumage new, no black collar. Two (Nov.) also want black collar. Only difference I can find between eclipse and winter-summer is absence of black collar (one has a few new blackish feathers) in eclipse. This plumage is apparently acquired by a more or less complete moult from July onwards.

ADULT FEMALE. WINTER AND SUMMER.—Coloration as male, but without black ring round neck and fore-head to crown, lores, area round eye, streak behind eye and usually chin white. Moult as in male. ECLIPSE.—No specimens moulting remiges examined. Apparently moult as in male and no difference in coloration between eclipse and winter-summer.

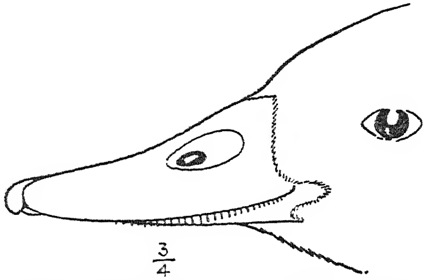
NESTLING.—Similar to Sheld-Duck, but without small patch of white in centre of brown patch on mantle and without small dark spot on cheek.

JUVENILE. MALE.—(Not examined.) As juvenile female, but with less whitish round base of bill (H. Wormald).

JUVENILE. FEMALE.—(*Upper-parts*) fore-head light buff to whitish; crown pale drab-grey, feathers edged buff; nape cream-buff; upper-mantle as adult; scapulars hair-brown with cinnamon-buff fringes; back and rump as adult, but rump not such an intense black and only faintly glossed green; upper tail-coverts black-brown tipped warm buff; (*sides of head* and *under-parts*) cheeks, sides of neck, chin, throat and fore-neck cream-buff or warm buff; under-parts pink-chestnut, in some pink-buff, deeper on belly and vent, flank-feathers with hair-brown bases; *tail* as adult but narrowly tipped buff; *wing* as adult but innermost secondaries with inner webs hair-brown, outer webs more or less cinnamon-rufous; *greater coverts* white clouded mouse-grey, outer webs paler and sometimes white, innermost tipped buff; *median coverts* white usually suffused pale mouse-grey and edged warm buff; *lesser coverts* white, in some washed pink-buff.

FIRST WINTER. MALE AND FEMALE.—As adult eclipse but distinguished by mouse-grey of *greater coverts* (sometimes on inner web only) and mouse-grey edges to *median coverts*. The juvenile body-plumage, tail and some innermost secondaries are moulted from Aug. onwards, but not rest of wings. FIRST SUMMER.—Moult as in adult after which body and tail as in winter and summer adults, males acquiring by Feb. black ring round neck but always distinguishable by mouse-grey retained juvenile greater coverts.

MEASUREMENTS AND STRUCTURE.—♂ wing 350–399 mm., tail 118–144, tarsus, 55–65, bill from feathers 42–50 (12 measured). ♀ wing 327–357, bill 36–47. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 3rd longest, 2nd 2–12 mm. shorter, 4th 7–13 shorter, 5th 24–35 shorter, 6th 45–54 shorter; 2nd emarginated inner, 3rd outer, 4th slightly outer webs. Innermost secondaries rounded and shorter than 7th primary. Both sexes with rounded carpal "spur" most prominent in adult male. Scapulars slightly rounded at tip. Tail almost square only slightly rounded, 14 feathers. Upper tail-coverts almost reach tip of tail. Bill as broad at base as at tip, culmen descending and slightly concave, lamellæ equally developed along inner edge of upper mandible, lamellæ on edge of lower mandible project outwardly.



The Ruddy Sheld-Duck (*Casarca ferruginea*). Male adult.

SOFT PARTS.—Bill (ad.) blackish; legs blackish; iris brown.

[*A.C.M.* revised by *H.F.W.*]

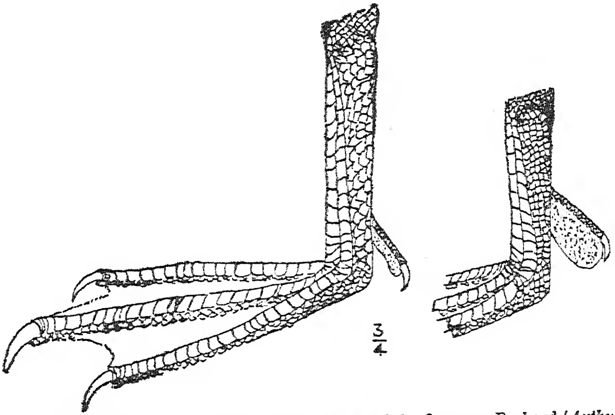
**Characters.**—No subspecies. Easily distinguished by its uniform cinnamon-rufous coloration. [*A.C.M.*]

## Genus ANAS L.

ANAS Linnæus, Syst. Nat., ed. x, i, p. 122 (1758—Type by subsequent designation of Lesson, 1828, *A. boschas*=*platyrhyncha*).

*Anas* comprises all British surface-feeding ducks with exception of *Spatula*.

Almost every species has been generically separated, on account of slight differences in structure of bill and of coloration. Bill nearly straight, wide, height at base considerably less than length from end of feathering to nail; both mandibles with distinct but short lamellæ; nostrils oval, near base. Wings long and pointed, 2nd and 3rd primaries longest. Sexes as a rule very different, sometimes alike in plumage (American and Pacific species, *A. angustirostris*, etc.). About 50 species in all parts of Globe.



Foot of the Mallard (*Anas platyrhyncha*) on left and the Common Pochard (*Aythya ferina*) on right, to show difference in hind toe of surface-feeding and diving Ducks.

*PLATES 80, 82, 83, and 85a.*

## **317. THE MALLARD—Anas platyrhyncha platyrhyncha L.**

ANAS PLATYRHYNCHOS Linnæus, Syst. Nat., ed. x, i, p. 125 (1758—Europe. Restricted typical locality: Sweden).
*Anas boscas* Linnæus, Yarrell, iv, p. 358; Saunders, p. 423.
*Anas platyrhyncha platyrhyncha* L., Pract. Handb., ii, p. 267.

**Habitat.**—The least exacting of ducks in its choice of waters, frequenting not only large and small lakes, lochs, reservoirs, and quiet reaches of rivers, but breeding regularly on quite small woodland and other ponds seldom visited by other duck, moorland and marsh pools, hill tarns, islands, etc., and establishing itself on lakes and ponds in town parks where undisturbed. General type of country inhabited also varies greatly, from arctic barrens to hot Mediterranean region, and from plains to considerable elevations. In winter large numbers also resort to sea-coast and estuaries, especially during frost, often resting in flocks off shore; floodlands and (abroad) irrigated cultivation are also much frequented. Will visit open fields and marshes some distance from any sheet of water to feed. *B.W.T.*

**Field-characters and General Habits.**—Apart from rather smaller size and slighter build does not differ from coloured breeds of domestic duck. Drake on water shows *dark green head, white collar, purplish-brown breast, and vermiculated pale grey back, shading to brownish above flanks,* which are also pale grey; at distance and in bright sunlight greys may appear almost white. Centre of back (showing in flight) dark brown, upper and under tail-coverts black, tail whitish, but four central feathers black and curled upwards. Wings in both sexes grey with black-edged *violet-purple speculum bordered by white on both sides,* which, when visible, at once identifies mottled brown and buff female. Brown speckling of under-parts is much stronger in some females than others. Full plumage of male usually from about end

Sept. to June; eclipse complete July to Aug.[1] Male in eclipse is much like female, but upper-parts darker and more uniform, without the conspicuous light buff edgings to feathers which give mottled appearance to duck, and breast darker. Juveniles also resemble female, but the young males have crown, neck, and upper-parts darker; they begin to show change to adult plumage about Aug., and this is generally complete about Nov. Bill of adult male greenish-yellow, of adult female dark olive often with some orange at sides; legs orange-red. Total length *c.* 23 ins.; body *c.* 15 ins.

Flight swift, with characteristic action in which wings are not depressed much below level of body, the strokes, though less rapid than in many species, producing distinct whistling sound; rises straight off the water when flushed and can hover after a fashion when uncertain whether to pitch. Walks easily with less pronounced waddle than domestic duck and nearly horizontal, instead of markedly upright, carriage. Female sometimes makes nest in trees, but otherwise only perches on low objects such as rocks, partly submerged stumps, etc. Gregarious in habits; outside breeding-season chiefly in pairs (many paired as early as Nov.) and scattered parties or flocks up to 50 or 60, which often split up further when flushed, but at times, especially when resting on sea, in close flocks of several hundreds. Very seldom any marked disproportion in numbers of sexes in flocks. Flocks do not usually adopt any marked formation in flight, but on migration " they fall into orderly wedge-shaped flocks or long wavering slanting lines which change continually " (Phillips). Drakes join up in little parties while ducks are sitting or tending broods. Outside breeding-season birds generally rest by day on open waters, and " flight " at dusk to feeding-places on smaller waters or on open fields or marshes and muddy shores, but nocturnal feeding appears to be a habit largely induced by persecution, as where undisturbed they also feed freely by day. In general feeding-habits are typical of surface-feeders. Millais records habit apparently not shared with other duck of sitting up in shallow water and rapidly paddling with feet to stir up insects, etc., in the mud. Young birds dive for food fairly freely and adults will do so at times; G. C. S. Ingram and H. M. Salmon have observed on a number of occasions systematic diving after fallen acorns in 2–3 ft. of water. Brief splashing plunges under water may also be observed in case of parties playing and chasing one another, and wounded or moulting birds or ducks molested by drakes will also seek to escape by diving. C. W. Townsend and Phillips consider that wings are used to some extent under water and latter author is " sure that very young birds spread the wing rudiments while diving." Intention to move off from any position whether on land or water is marked by upward movement of bill, which becomes faster and more jerky before taking flight (O. Heinroth). *B.W.T.*

**Voice.**—The well-known loud, deep, coarse " quark " and its variants (see below) is peculiar to female. Male's note is much more subdued, but higher-pitched, rather grating " quek " and " quek-ek-ek." (Various renderings have been given of this note, such as " rāb," " drāk," " weep," etc., but the use of different initial letters seems to exaggerate difference between notes of male and female, which, while marked, is less than in many other species.) Male has also a low whistling note in courtship and immediately following coition, and Millais writes of " a gentle croaking noise." Different variations of female's note according to circumstances have been carefully studied by O. Heinroth (*Verh. d. V Internat. Orn.-Kong., Berlin, 1910*, p. 679), who distinguishes loud, nasal repetition used as call-note (but not in breeding-season), the more prolonged quack of alarm, single or repeated (throughout year), soft forms when about to fly or in other circumstances entailing " a certain inner restlessness," another subdued form analogous to clucking of hen, when undisturbed in charge of brood, a special version, rendered " queggeggegegqueggegeg," chiefly as incitement to male to attack intruder ; the more " conversational " " quuk-uk-uk" commonly heard from groups on the water is presumably regarded as a form of the call-note. *B.W.T.*

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[1] Dates given for duration of eclipse and full plumage must be understood as merely rough guides for field purposes, there being marked individual as well as geographical variation.

**Display and Posturing.**—Much has been written on Mallard display, in which usually several males perform round one duck. H. Wormald (*Brit. B.*, iv, pp. 2–7, with figs.) describes and figures five principal postures : (1) Swimming round duck with head sunk and neck drawn back. (2) Bill suddenly lowered so that tip is in water, birds at same time standing up in water and then rapidly passing bill up breast, this movement being performed with slight jerk so that tiny jet of water is thrown forward as bill is withdrawn ; accompanied by whistling note. (3) Breast lowered and tail raised 2 or 3 times in quick succession ; often followed by repetition of 1 and 2. (4) Quick " throw-up " of head and tail with feathers of head puffed out. (5) Quickly following on 4 ; neck stretched out just over water as birds swim about in different directions ; commonly followed by return to 1. Sequence given is not invariable, but 1 is almost always first and 5 last, the latter attitude being also assumed by drake immediately after coition. S. E. Brock found that a sixth posture, in which fore-part of body is raised rather slowly out of water, head and neck being extended upwards at abrupt angle, usually intervened between 1 and 2, while H. Boase describes alternative preliminary attitude to Wormald's No. 1, with neck extended vertically and bill held level (common also in alarm and suspicion), and gives slightly different account of main attitudes. His No. 6 is Wormald's No. 4 ; No. 1 is variant of this, in which bird first dips bill, rises slightly in water as neck is raised and then sinks again, and No. 2 is merely much more rapid and vigorous form of same ; 2 and 6 accompanied by the whistling call. No. 4 is Wormald's No. 1, and 3 and 5 are variants in which (3) bird merely presses bill on neck without the drawing-up action or (5) instead of pausing thus continues action so that in risen position neck is extended and bill pointed upwards. Two other display postures are mentioned : stretching of neck at moderate angle with head in line and wings held close to sides, not opened as in ordinary settling of plumage, and (infrequent) a rolling back of head on to back so that bill is vertical ; accompanied by snapping of bill. Drake's display is generalized social form of sexual response peculiar to preliminary stages of sexual cycle. It is often initiated by duck swimming rapidly among drakes in attitude like male's No. 5, moving head from side to side with a waving motion (Boase), and intensity of display in drakes is greatly influenced by behaviour of female. Sooner or later female takes initiative in picking out and " courting " individual drake, dipping bill repeatedly and rapidly to right and left and uttering curious guttural note as drake withdraws from the group and she pursues (this may also occur without preceding display by drakes).

Female also occasionally assumes postures 1 and 6 (Brock). Other drakes often follow, but are usually repulsed by duck and make no serious attempt to interfere. Display has thus no connexion with coition and does not occur in breeding-season or, apparently, in truly paired birds, but serves as kind of " introduction " leading to association of individual pairs, which may be loose at first, but gradually becomes fixed. It is regular in Oct. (frequently even in latter half Sept.), but after this activity decreases and Boase found complete performance exceptional by end Jan. For fuller details and discussion of display see especially Boase, *Brit. B.*, xxv, pp. 12–17, and Brock, *Scott. Nat.*, 1914, pp. 78–86. Coition observed in Scotland as early as Jan. 1 on fresh water and also seen on salt-water on several occasions, Dec. 6, Jan. 21, etc. (Boase), but O. Heinroth finds treading regular from the end of September notwithstanding that gonads are not mature till Dec. or later. Coition, as in all ducks, takes place on water and is preceded by both birds moving head rapidly up and down, keeping bill almost horizontal (Boase, Heinroth) ; immediately afterwards male swims round female in Wormald's attitude 5. A peculiar feature of behaviour in *late spring* is habit of drakes of indiscriminately pursuing any duck they see, including breeding birds coming off nest. This gives rise to excited aerial chases with several drakes in pursuit of one duck, which they appear to endeavour to force down and " rape."[1] Paired females incite their mates to attack intruders in manner recalling that of Ruddy Sheld-Duck (*q.v.*), but this is a less prominent feature of behaviour than in that genus (Heinroth). " Injury-feigning " by female with brood is common ; also at least one record of male, which occasionally takes some interest in family. *F.C.R.J. & B.W.T.*

**Breeding.**—Usually nests in fairly thick covert, under bushes or hedgerows, on islands, etc., on ground within easy distance of water, but at times also in pollarded willows, holes of trees, old nests of Crows or other birds, ivy-covered ruins, etc. *Nest.*—Made by duck, lined dead leaves, grasses, etc., mixed with down and feathers. Down brown, with rather large indistinct light centres, tips lighter. Feathers characteristic (see Plate 85A): sometimes almost absent, perhaps cases of second layings. *Eggs.*—Usually about 10 or 12, but may be any number from about 7 or 8 to 16: shape rather broad ovate, with blunt end: colour variable, generally greyish-green or greenish-buff, but occasionally clear pale blue, surface waxy. Average size of 100 British eggs, 57·17×41·03. Max.: 61·4×41·5 and 59·6×43·3. Min.: 52·2×39·9 and 57·4×38·1 mm. Average weight, 4·28 grams (5·8 to 3·15 gr., E. Rey). *Breeding-season.*—Normally in March, but probably owing to artificial conditions may be found breeding from Feb. to Oct. and even Nov. *Incubation.*—By female alone on completion of clutch, covered by down during laying: male generally in neighbourhood. Period rather variable: average of 100 cases 28–28½ days (J. M. Derschied), but 26, 24, and even 22 recorded. *Fledging.*—Young when dried led by duck to water and tended in many cases by her alone, but also evidence of drake keeping company. Period 7½ weeks (O. Heinroth). Probably in a purely wild state single-brooded, but under protection may breed twice. *F.C.R.J.*

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[1] These pursuit-flights (Reihen) have been discussed at length by German authors, notably Heinroth, Geyr von Schweppenburg and E. Christoleit. Geyr (*Journ. f. Orn.*, 1924, p. 472) has pointed out that under the term " Reihen " two types of behaviour have been confused : (1) Territorial pursuits, in which a paired male pursues and drives off the female of an intruding pair, with the male of the latter (and sometimes also the mate of the pursuing drake) following. (2) True " Reihen " or harrying of a single (frequently nesting) female by a number of drakes (up to 7 or more). Christoleit, while admitting that assaults on nesting females do occur, maintains that the " Reihen " proper entails no " rape " of the duck, but is undertaken voluntarily and is a genuine form of display. According to this certainly novel view the duck, though associating with a single male for breeding purposes, secures actual fertilization by the most vigorous male available. In support of this view it is maintained *inter alia* that the duck often rises without pursuers and flies round conspicuously calling the drakes to her, that when pursued she does not dash away in panic, but flies round within a wide but not unlimited area, that frequently she settles quite peacefully with the last remaining suitor (or even with several) after the rest have dropped out one by one, coition by no means always following at once, and that the note used by a nesting duck molested by strange drakes is different from that used in the genuine " Reihen." Geyr, whose observations were facilitated by being made in an area where wild birds had grown largely accustomed to human beings, disputes Christoleit's interpretation of his observations and some of his facts as well. For a full statement of the case on both sides reference must be made to the lengthy original discussion (*Beit. Fortpfl. Vög.*, 1929, pp. 45, 169, 212, and 1930, p. 24), but it must be said that without independent confirmation of Christoleit's account the more usual interpretation (as advocated by Heinroth and Geyr) appears less biologically improbable. See, however, under Gadwall. *B.W.T.*

**Food.**—Mainly vegetable matter, including seeds, buds, and leaves of many species, both aquatic and land plants (*Ranunculus* spp., *Callitriche verna*, *Ceratophyllum submersum*, *Potamogeton*, *Lemna*, etc.: seeds of *Galium*, *Suæda*, *Carex*, *Persicaria*, *Polygonum*, etc.): also *Zostera marina*, acorns, blackberries, and grain of various kinds. Animal food includes insects (Hemiptera, Trichoptera (*Phryganeidæ* larvæ), Coleoptera (chiefly water-beetles and larvæ of *Elateridæ*), Hymenoptera (*Formicidæ*) and Diptera): Mollusca (*Littorina*, *Lacuna*, *Rissoa*, *Helix nemoralis*, *Planorbis*, *Bulla*, *Cardium* (small), *Montacuta*, *Cyclas*, *Tellina balthica*, etc.): Crustacea (small *Carcinus*), leeches, worms, frogs, tadpoles, and spawn; also fish (small eel, and *Alburnus lucidus*). *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident, passage-migrant and winter-visitor. Generally distributed. *H.F.W.*

**Migrations.**—*British Isles.*—Recoveries of ringed birds indicate that British Mallard are resident and to a large extent sedentary, moving but short distances from where bred except under stress of weather, when movements to coasts and southward take place, but not beyond British coasts except occasionally to Ireland. Passage-migrants and winter-visitors from Continent (ringed birds from W. Russia, Finland, Sweden, Norway, Iceland, Færoes, Estonia, Latvia, W. Poland, N. Germany, Denmark, and Holland) arrive N. and E. coasts mid-Sept. to end Nov. and pass to all parts including Ireland. Range to south variable and dependent on weather conditions and under unfavourable conditions southerly movement may be renewed at intervals during winter. Some passage-migrants pass through at least as far as N. France. Return passage mid-Mar. to early May. British ringed birds have been recovered as abmigrants [1] in subsequent years in N. France, Holland, N. Denmark, W. Poland, N. Germany, and S. Sweden. *N.F.T.*

**Distribution Abroad.**—A Holarctic species. Typical race breeds in Europe in Iceland, Færoes, Norway to 70°, N. Finland and Russian Lapland. Also in Siberia, and across Asia (Turkestan, Semipalatinsk, Altai, Tarbagatai, Tibet, N.W. Mongolia to Kamtschatka and Manchuria, Bering Is., Kuriles, Sakhalin, and Japan). Breeds south to Mediterranean and Black Seas: also Azores, N.W. Africa to Sahara, Balearic Is., Corsica, and Sardinia, Asia Minor, N. Persia, and Kashmir. Also in N. America from Aleutian and Pribilof Is., N.W. Alaska, N. Mackenzie, Manitoba, Hudson Bay and locally to S. Canada, Nova Scotia and New Brunswick, but replaced by local race in Greenland (*A. p. conboschas*). Partly migratory, some reaching Madeira, Canaries, Abyssinia, Arabia, Socotra, India, N. Burma, China, and Borneo: in America south to Mexico, Panama and Lesser Antilles. Accidental in Spitsbergen, Hawaii, Bermuda, W. Indies, and Bahamas. *F.C.R.J.*

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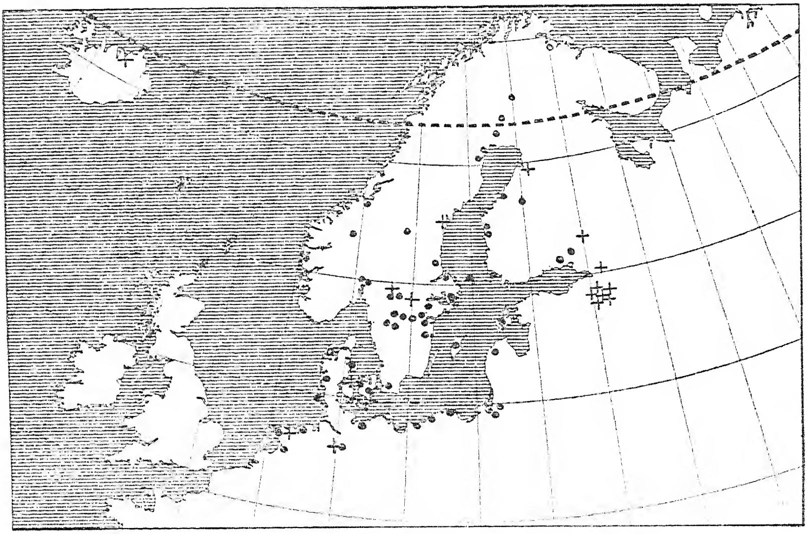
[1] Dr. A. Landsborough Thomson defines abmigrants as birds that make a northward departure in spring, for a new summer area, without having made a corresponding southward journey in the previous autumn and suggests that they accompany in spring foreign birds with which they become associated by chance in this country in winter (*Problems of Bird Migration*, pp. 209–211). *N.F.T.*



Map to show origin of Mallards visiting British Islands in winter.
(Compiled from records of ringed birds by Miss E. P. Leach.)

Dots show recovery positions in breeding-season of birds ringed in winter in Great Britain. Crosses show localities where birds afterwards reported in winter in the British Islands were ringed in the breeding-season.

**Description.**—ADULT MALE. WINTER AND SUMMER.—*Head* and *neck* all round metallic-green (sometimes crown black-green) more or less glossed violet-purple, feathers of crown and nape when new with narrow sandy-brown tips (soon lost by abrasion); feathers at base of upper mandible and chin and in some throat dull blackish glossed green, narrow white collar not completely meeting on nape encircles lower-neck; (*upper-parts*) upper-mantle finely vermiculated ash-brown and white, feathers suffused towards tip cinnamon-brown, feathers of lower-mantle with black-brown centres and usually only faintly vermiculated white and with broad cinnamon-brown edges; scapulars finely vermiculated grey and white, some suffused chestnut-brown, some with inner webs blackish slate-grey and some with outer webs pale smoke-grey; back black-brown slightly glossed green, rump and upper tail-coverts black glossed vivid blue-green; (*under-parts*) upper-breast rich chestnut-brown (feathers when fresh with white tips soon lost by abrasion); breast, belly, flanks, and vent finely vermiculated grey and white; under tail-coverts black glossed dull blue-green; axillaries and under wing-coverts cream; *tail* deep mouse-grey, outer feathers palest grey, broadly edged and slightly vermiculated white, two central pairs black glossed blue-green and curled backwards; *primaries* mouse-grey, paler on inner webs; *secondaries* mouse-grey broadly tipped white, outer webs glossed violet-purple or blue-green (according to angle of light), and with black-brown subterminal bar (forming, with black and white bars of greater coverts, *speculum*); innermost mouse-grey, outer ones suffused chestnut-brown on outer webs and narrowly bordered black, that next speculum with broad velvety-black border on outer web; all *primary-coverts* and *bastard-wing* mouse-grey; *greater coverts* mouse-grey with white subterminal and black terminal bars, innermost mouse-grey suffused cinnamon-brown; *median* and *lesser coverts* hair-brown. This plumage is acquired by a moult of body-feathers, tail and innermost secondaries Aug. to Nov., curled tail-feathers and new innermost secondaries are acquired last. A few odd body-feathers may occasionally be renewed in spring, otherwise no moult. Fore-head, crown, lores, chin, throat and fore-neck become more or less dull black owing to abrasion of green tips of feathers.

ADULT MALE. ECLIPSE.—The body-feathers and two central pairs of curled tail-feathers are first moulted and later rest of wing- and tail-feathers. Moult commences June or July, exceptionally May. Rather resembles adult female eclipse, but distinguished at a glance by more uniform *crown* and *mantle*. Distinguished from juvenile by *under-parts* not narrowly streaked black-brown. (*Upper-parts*) crown and upper-nape brown-black glossed dull green, resembling juvenile male, but feathers without or with only faint buff tips; centre of nape dark ash-brown, feathers faintly edged buff; rest of nape streaked black-brown; mantle black-brown, some feathers edged lighter brown; scapulars black-brown edged buff; back and rump black-brown glossed olive-green; upper tail-coverts black-brown glossed green and edged buff; (*sides of head* and *under-parts*) a streak from base of upper mandible through eye to nape black-brown usually glossed metallic-green; lores, cheeks, sides of neck, chin, throat and fore-neck as in female, fore-neck usually streaked black-brown; upper-breast much as in female; sides of breast and flanks sepia or black-brown, feathers fringed buff, sometimes vermiculated creamy; rest of breast, belly and vent as in female, in some heavily streaked sepia, in others with oval sepia spots; under tail-coverts as in female, but with larger spots; *tail* as in adult winter-summer male but two new central pairs sepia edged light buff, in some quite straight, in others tending to twist back; *wing* as in adult winter, but new innermost secondaries hair-brown rather than mouse-grey and more or less tinged olive-brown on inner webs. There is considerable individual variation in eclipse plumage.

Another type of eclipse male has lower-breast, belly, vent and upper series of under tail-coverts pale ash-brown or ash-white, more or less vermiculated dusky-brown or greyish-white, feathers sometimes with brown drops and narrow buff fringes, sides of body and flanks more plentifully vermiculated whitish.

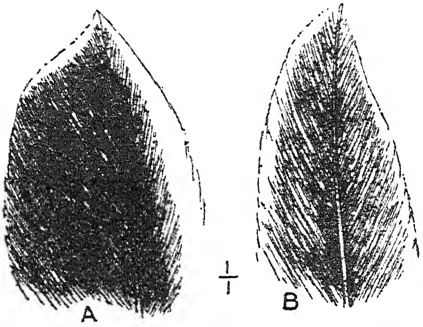
Some birds moulting out of eclipse get some snuff-brown feathers, some shaded blackish towards tips, also buff feathers with blackish tips or streaks on cheeks, these feathers being subsequently shed.

ADULT FEMALE. WINTER AND SUMMER.—(*Upper-parts*) crown heavily streaked black glossed dull green, feathers edged light buff; nape light buff faintly streaked black-brown; mantle, scapulars and upper tail-coverts black-brown, feathers fringed buff, and often with irregular markings or V-shaped buff bars; back and rump black-brown or sepia more or less glossed green, feathers edged, and sometimes barred, buff, and sometimes with spots or streaks of black-brown; (*sides of head* and *under-parts*) cheeks and sides of neck light buff narrowly streaked black-brown; black-brown streak from lores through eye to nape: chin and throat warm buff, in some spotted or streaked dusky; upper-breast buff, in some cinnamon, centre of feathers with brown drops, streaks, or crescent-shaped marks; rest of breast, belly and vent buff, in some heavily streaked, in others more lightly spotted or streaked ash-brown or sepia; sides of body and flanks sepia broadly edged buff, and with irregular buff markings; under tail-coverts buff with central markings or spots of sepia, tips creamy-white; *tail* sepia or ash-brown edged and more or less irregularly marked and barred warm buff; *wing* as in male, in some *speculum* narrower; new innermost *secondaries* brown edged and with irregular markings of light buff; *median coverts* darker. The body-feathers are completely moulted Oct. to March, in some tail-feathers are moulted Oct. and Nov., occasionally an odd pair of tail-feathers may be renewed in spring; new innermost secondaries are not acquired till April or May. Forward birds, except for innermost secondaries, may be in complete breeding dress by Nov. The *nest-down* is acquired March and April.

ADULT FEMALE. ECLIPSE.—The body and tail-feathers are completely moulted July and Aug. Like winter and summer but feathers of *crown, mantle* and *scapulars* more narrowly edged buff, those of mantle without buff bars, scapulars with fewer buff streaks, mantle and scapulars thus appearing darker and more uniform; innermost *secondaries* without buff streaks, those next speculum not so richly marked chestnut.

NESTLING.—Crown, nape, mantle, back, rump and uropygial tuft, patch on side of body and back of thigh dark sepia or black-brown with an olivaceous tinge, long down-filaments in some with yellowish tinge; wing-bar, small patch on either side of centre of back below wing and another on either side of rump light yellow; lores, cheeks, streak over eye and sides of neck yellow-buff; well-defined line of sepia from lores through eye to top of nape, below this line in some a streak of sepia extending half-way from nape to eye, in some a tiny streak of sepia at lateral base of upper mandible; remaining under-parts pale yellow-buff shading to cream-buff or cream-yellow on breast and belly.

JUVENILE. MALE.—In general appearance resembling adult eclipse female but *under-parts* narrowly streaked sepia, *tail-feathers* narrower and usually with tip of shaft bare. (*Upper-parts*) crown, mantle and scapulars black-brown as in adult female eclipse, but feathers with narrower buff edges, mantle with few buff bars; back and rump black-brown glossed dull olive; lower-rump and upper tail-coverts sepia, fringed buff; *cheeks, sides of neck* and rest of *under-parts* more narrowly streaked or spotted ash-brown; *tail-feathers* ash-brown edged and irregularly marked warm buff; *wing* as adult male, but innermost secondaries shorter, duller and less suffused cinnamon-brown; short inner ones and innermost *greater coverts* hair-brown tipped buff; *median* and *lesser coverts* as in adult male.



Tips of tail-feathers of the Mallard (*Anas p. platyrhyncha*). A, Adult. B, Juvenile, to show difference in structure.

FEMALE.—As male, but feathers of *back* and *rump* black-brown edged and sometimes barred buff; innermost *secondaries* shorter and browner than in juvenile male and adult female; *median* and *lesser coverts* with buff edges (soon becoming abraded).

FIRST WINTER AND SUMMER. MALE.—Like adult winter and summer and when all juvenile body-feathers are renewed difficult to distinguish with certainty. *Wing* appears more worn than in adult and some juvenile feathers are often retained on back and rump. In some birds some snuff-brown feathers spotted or streaked dusky are acquired on *cheeks* and at *sides of throat* intermixed with buff feathers with blackish tips, these feathers being subsequently shed. In others chestnut-brown feathers of *upper-breast* bordering lower-breast have small round blackish spots, while in others more coarsely vermiculated *flank-feathers* appear. These feathers on chin, throat and breast and flanks represent no doubt traces of a plumage now lost. The body-feathers (not always all those of back and rump), tail and innermost secondaries are moulted Aug. to Dec. or even Feb.

FIRST WINTER AND SUMMER. FEMALE.—Like adult winter and summer female and difficult to distinguish with certainty except by more worn appearance of juvenile innermost *secondaries*. The body-feathers (apparently not always back) and tail, but not wings, are moulted from Aug. onwards; specimens in moult occur in every month to April. Some in Aug.-Sept. appear to get a flush of feathers on *mantle* and *scapulars* resembling adult eclipse but these are in most almost at once replaced by 1st breeding plumage. Forward young females in 1st breeding plumage occur in Oct.; they probably moult again in spring as some April birds examined were acquiring fresh breeding plumage like the old worn feathers. In some moult of tail is not completed (some juvenile tail-feathers being retained) until April. Juvenile secondaries are renewed and *nest-down* is acquired in March and April.

MEASUREMENTS AND STRUCTURE.—♂ wing 260–288 mm., tail 82–95, tarsus 40–44, bill from feathers 50–56 (12 measured). ♀ wing 240–267, bill 43–52. Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd sometimes equal, usually 3–7 mm. shorter, 4th 7–12 shorter, 5th 18–27 shorter, 6th 27–45 shorter; 2nd emarginated inner, 3rd outer and 4th slightly outer web. Longest innermost secondary shorter than 5th primary; innermost secondaries tapering and acuminate, in eclipse blunter not so sharply tapered. Long scapulars tapering at tip, rest rounded tapering to a point laterally, in eclipse rounded. Tail rounded, 18 to 20 feathers, two central pairs (in some only one pair) curled, in eclipse straight. Bill broad, about as long as head, higher than broad at base, depressed and widened towards end, which is broadly rounded; nail rather small and decurved at tip, edges parallel, middle of culmen a little concave, terminal part behind nail convex; lamellæ scarcely exposed.

SOFT PARTS.—Bill (ad. ♂) greenish-yellow to bright yellow, culmen and tip blackish, (ad. ♀) greenish-olive, often dull orange at sides, culmen and tip dark horn, (juv.) reddish-horn; legs and feet (ad. ♂ and ♀) orange-red, (juv.) orange; iris brown. [*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Violet-purple speculum bordered above and below by black band succeeded by white one distinguishes species in all plumages. *A. p. conboschas* (Greenland) has upper-parts and wing-coverts greyer, and males have flanks much more coarsely vermiculated, feathers of chestnut-brown upper-breast with black spots towards tip; *A. p. subboschas* (Iceland) has been separated but the differences are too slight for acceptance. [*A.C.M.* revised by *H.F.W.*]

*PLATES 80, 82, 83, and 85a.*

## 318. THE GADWALL—Anas strepera L.

ANAS STREPERA Linnæus, Syst. Nat., ed. x, i, p. 125 (1758—Europe. Restricted typical locality: Sweden).

*Anas strepera* Linnæus, Yarrell, iv, p. 370; Saunders, p. 425; Pract. Handb., ii, p. 272.

**Habitat.**—Especially in breeding-season prefers quiet lakes, lochs, marsh pools, and other still waters with good cover or sluggish streams bordered by rank vegetation. In winter in India occurs on all types of river, marsh and tank, wherever other ducks are found (H. Whistler); in America principally on inland pools, marshy lakes, sloughs and swamps, but to some extent brackish pools and estuaries along the coast (A. C. Bent). In general resorts to sea much less than Mallard, though occasionally seen on salt-water when migrating and will rest at sea by day (Millais). *B.W.T.*

**Field-characters and General Habits.**—Drake rather smaller than Mallard, *at distance looking fairly uniform grey-brown with black upper and under tail-coverts*; at closer quarters shows fine "pepper and salt" speckling on head and neck, *vermiculated pattern on back and flanks*, bolder pattern of dark and light crescentic markings on breast, and long secondaries mouse-grey. *White speculum*, forming prominent patch on hind border of spread wing is diagnostic in flight, but on the water it is often concealed, as is black band in front of it and (nearly always) chestnut patch on coverts, unless bird preens or spreads wings. Bill dark grey; legs orange-yellow. Tends to sit higher on water than Mallard, with stern more elevated, but this is not always noticeable. Female is much like Mallard in plumage, but more slightly built. White speculum at once identifies her when visible, but, as in male, it is often concealed when at rest. There is little or no chestnut on coverts. *Orange at sides of bill* is a good differentiating character (some female Mallard show some orange, but rarely if ever so much as Gadwall) and orange-yellow, not orange-red, legs can be seen when she "up-ends"; in flight white belly is further distinction. Male is very early in assuming eclipse, which is generally complete by beginning of June in adults (sometimes earlier); change to full plumage begins in Aug. and is usually complete in Oct. (Millais). Male in eclipse is much like female, but upper-parts darker and chestnut on wing-coverts retained. Immature birds resemble adult female, but have strongly spotted under-parts; young males do not acquire approximately full plumage till about March. Total length *c.* 20 ins.; body *c.* 13 ins.

In flight wings look more pointed than Mallard and strokes are rather more rapid, flight recalling Wigeon's; accompanied by low whistling sound. General habits much as Mallard, though on the whole shyer and more retiring. In Brit. Is. seldom seen in any numbers together, except in Norfolk, where I have seen two hundred and forty on one mere in winter. Flocks up to thirty, however, are recorded in Scotland. In India, where abundant in winter, is usually found in flocks of 10–30. Does not associate much with other species. According to A. C. Bent will dive for food if necessary, but Phillips asserts that only young birds dive unless wounded. *B.W.T.*

**Voice.**—Note of female is a quack, less loud and coarse than Mallard duck's, and this may be heard freely from flocks on water. Ordinary note of male is variously described as a chuckling croak (C. Oldham), a loud, deep, rattling "rāb" (O. Heinroth) or loud "kack, kack" (A. Wetmore), and has been likened to croak of Raven; has also a shrill whistling call used in display commonly preceding the croak (Heinroth), while a low, deliberate "ep, ep, pār" (T. A. Coward) and a deep, reedy note resembling the syllable "whack" (A. Wetmore) are also described as courtship notes. A "quaint trilling 'quer-r-r-r-r,'" apparently used only by male in breeding-season (J. W.-Bond), appears to be different, and same author also describes a quickly iterated "kwuk-uk-uk-uk." *B.W.T.*

**Display and Posturing.**—According to H. Wormald display is very similar to Mallard's, but action No. 5 (*cf.* p. 233) is seldom used except after coition. Millais and O. Heinroth, however, both describe it as much simpler and less demonstrative, consisting merely of raising head high up with bill horizontal and lowering it with quick lateral movement (Heinroth), occasionally with "quick jerking of the bill and an elevation of the tail" (Millais, fig. p. 32). Phillips has observed the up-and-down movement on land as well as water. A. Wetmore describes male bowing by extending neck till head was *erect* (italics ours) and then retracting, and pressing his breast against female's side, biting her back and rump gently as he did so.

According to E. Christoleit pursuit-flights occur as with Mallard, and Wetmore gives a description of a "mating-flight" on the breeding-ground which, if the same thing, appears in its peaceable and ceremonial character to give support to Christoleit's views, *cf.* p. 234.[1] He describes coition with female entirely submerged save for crown of head, while half of male's body was under water. As female emerged male faced her and bowed deeply, giving deep reedy call. At least one record of "injury-feigning" from eggs (W. L. Dawson). *F.C.R.J. & B.W.T.*

**Breeding.**—Usually nests in very thick vegetation and close to water; frequently so far in that no sign of bird or nest is visible from above: on islands in lakes may breed socially. Also among rank growth of reeds and sedge bordering slow-flowing stream. *Nest.*—Formed by duck on ground, of down, mixed with some grass, sedges and vegetable matter. Down dark, with rather small light centres and characteristic greyish-white extreme tips. Feathers, see Plate 85A (some white). *Eggs.*—Usually 8 to 12, but 7 and 13 to 16 recorded: blunt ovate, warm creamy-buff, resembling those of Wigeon. Average of 100 British eggs, 54·27×39·06. Max.: 59·9×40 and 53·5×43·5. Min.: 50·4×37·5 and 53×36·2 mm. Average weight, 4·09 grams (4·7 to 2·9 gr., E. Rey). *Breeding-season.*—Full sets from about 1st week May in south to end May and beginning June in Scotland. *Incubation.*—By duck alone, begins with completion of clutch. Period 27–28 days. *Fledging.*—Young, after drying, taken to water by duck: male not observed to accompany family. Period about 7 weeks (O. Heinroth). Single-brooded. *F.C.R.J.*

**Food.**—Chiefly vegetable matter, such as buds, leaves, and roots of aquatic plants and seeds of *Potamogeton*, *Glyceria*, *Carex*, and various rushes and grasses: some grain (especially oats) is taken and in winter-quarters rice: animal matter in small quantity, but includes worms, small Mollusca, aquatic insects, small frogs and spawn, also occasionally small fish. *F.C.R.J.*

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[1] Wetmore's account (*Auk*, 1920, p. 240) is so precise and so significant in connexion with the general problem of the peculiar sexual behaviour of ducks that it is desirable to quote it verbatim. "The flight was usually performed by two males and one female. In the beginning two males approached a female on the water, calling and bowing. She usually rose at once and flew with a slow, flapping flight, mounting in the air with the males in pursuit, calling and whistling constantly. First one and then the other of the males swung in front of her, set his wings, inclined his body upwards to show his handsome markings, and, after a few seconds, dropped back again to his former position. Later in the season there was always one of the males who was favoured and who displayed more than the other, flying close to the female, so that in passing his wings often struck hers, making a rattling noise. After a short time the second male often left the pair and returned to the water. The birds frequently mounted until they were 300 yards or more in the air, and darted quickly from side to side, flying now rapidly and now slowly. When the flight was over the birds descended to the water again. I was never able to ascertain whether there were some extra males about or not, as though there were usually two with the female in this flight I found them at other times always in pairs." *B.W.T.*

**Distribution.**—*British Isles.*—Resident and winter-visitor (mid-Aug.–end Oct. to March–end April). Breeds regularly in fair numbers (originally introduced 1850) Norfolk and Suffolk, and since 1909 (probably 1908) on Loch Leven (Kinross), and now also breeds tolerably regularly in several lochs within 20 miles, also sporadically in Caithness (since 1912), Ross and Sutherland (since 1913), Lothians (since ? 1916), Fife (since 1918) ; has also bred Armagh (1933 and 1936) and Fermanagh (1938), Inverness (1936, 1938), Peebles (1906), Wigtown (1913), Essex (1921), Cambridge (1938 and ? 1917), Herts (1928), Surrey (1936, 1938), and Cumberland, but last two probably due to young of introduced birds. Elsewhere autumn to spring visitor, uncertain and scarce or rare in most parts, but common Tiree ; generally appears to be increasing in frequency. Birds ringed in Iceland have been recovered in Sussex, Kerry (2), Galway (2), Westmeath, Roscommon, and Fermanagh between Oct. and Feb. *H.F.W.*

**Distribution Abroad.**—Holarctic region. Breeds in Europe in Iceland, central and S. Sweden, Denmark, E. Prussia, Poland, Russia, north to 59°, east to Perm Govt. Also in Asia : Transcaspia, Aralo-Caspian region, S.W. Siberia to 58° on Yenisei, E. Siberia, N.W. Mongolia, and east to Kamtschatka and Bering Is. In south from S. Spain, S. France, Yugo-Slavia, Bulgaria, Romania, S. Russia to Caucasia. Also N. Algeria (Lake Fetzara). In Asia south to Turkestan, N. Persia, and N. Afghanistan. In America from Little Slave Lake, Lake Athabaska and Hudson Bay to California, Utah, Colorado, New Mexico, Kansas, Iowa, Wisconsin, and Minnesota. Winter range extends to N.W. Africa, Nigeria, and Abyssinia : Red Sea, Socotra, Iraq, India, China, and Japan : in America to Gulf of Mexico and Jamaica. Accidental in Greenland, Norway, Finland, Baltic states, Yalmal peninsula, Pribilof Is., Alaska, Bermuda, and Cuba. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) crown and nape black-brown, feathers tipped and barred cinnamon ; mantle and some scapulars vermiculated blackish-grey and cream, rest of scapulars mouse-grey edged buff-brown, long ones mouse-grey ; back black or olive-brown, usually finely freckled and vermiculated cream ; rump and upper tail-coverts black glossed dark blue ; (*sides of head* and *under-parts*) fore-head, lores, cheeks, sides of neck, chin, throat and fore-neck light buff, spotted and barred dusky ; feathers of upper-breast with alternate black-brown and white bars towards tip, terminal ones crescent-shaped (barring often replaced by indefinite black-brown frecklings) ; rest of breast, belly and vent white or faintly freckled or barred dusky ; sides of body, flanks and short under tail-coverts vermiculated as mantle ; rest of under tail-coverts black ; axillaries and under wing-coverts white ; *tail* ash-brown, sometimes feathers with blackish borders, outer feathers paler, edged and occasionally marked buff ; *primaries* mouse-grey, paler on inner webs shading to white at base; outer *secondaries* dark mouse-grey tipped white, succeeding ones with outer webs black, inner ones with outer webs white, innermost mouse-grey ; *primary-coverts* and *bastard-wing* mouse-grey, *median* and *lesser primary-coverts* same spotted and edged cream ; *greater coverts* black, outer ones mouse-grey, in some tipped chestnut and with outer web more or less bordered black, inner ones with inner webs mouse-grey ; lower series of *median coverts* mostly black, or chestnut tipped black, outer ones and upper series chestnut, inner ones mouse-grey spotted and freckled cream ; *lesser coverts* mouse-grey vermiculated and spotted cream. *N.B.*—There are two types of males, one with a brownish and one with a more greyish head and neck. This plumage is acquired by a moult of body-feathers and innermost secondaries Aug. to Nov. or even Jan. In spring a few body-feathers may be renewed, otherwise no moult.

ADULT MALE. ECLIPSE.—The body-feathers are first moulted, followed by wing and tail from May or June. *Upper-parts* resemble juvenile male more than adult female, upper-mantle being barred but *under-parts* not narrowly streaked or spotted as in juvenile and *wing* that of adult. *Head* and *neck* as adult female; (*upper-parts*) mantle black-brown, feathers with broader and more semi-circular bars of pink-buff than in juvenile; scapulars black-brown edged cinnamon-buff, upper ones with a V-shaped mark of same; back and rump sepia tinged olive, feathers with lighter brown edges; upper tail-coverts as in adult female; (*sides of head* and *under-parts*) cheeks, sides of neck, chin and throat more heavily streaked than in juvenile; feathers of upper-breast whitish with transverse black-brown bars, an irregular subterminal black-brown marking, and tipped cinnamon-buff; sides of body and flanks as in adult female but feathers with V-shaped buff markings; rest of breast, belly and vent white, feathers mostly with larger and not so numerous spots as in juvenile; under tail-coverts white with irregular sepia markings; *tail* apparently as winter; wing as in winter, but innermost secondaries shorter, less tapering at tip and tinged brown.

ADULT FEMALE. ECLIPSE.—(*Upper-parts*) crown streaked black-brown glossed dull green, feathers edged warm buff; nape dusky-brown, feathers edged light buff; mantle, scapulars and upper tail-coverts black-brown tinged olive, feathers with broad fringes and most with V-shaped markings and barrings of buff; long scapulars olive-brown faintly tipped white; back and rump sepia glossed olive, feathers edged and usually barred buff; (*sides of head* and *under-parts*) indistinct black-brown streak from base of upper mandible through eye to nape; cheeks, sides of neck, chin, throat and fore-neck light buff narrowly streaked dusky-brown, upper-breast warm buff, with markings of black-brown; remainder of breast and belly white (in some spotted with dusky at side); sides of body, flanks and under tail-coverts sepia, fringed and marked buff (in some under tail-coverts white marked sepia); vent cream-white; axillaries and under wing-coverts white; *tail* as male but with irregular buff markings; *wing* as male but middle *secondaries* with outer web greyish bordered black, innermost secondaries and coverts olive-brown faintly tipped creamy; *greater coverts* as male but black not so intense or extensive, outer ones mouse-grey tipped white, inner ones with inner webs olive-brown; lower series of *median coverts* as male but sometimes with no chestnut, inner ones and upper series olive-brown edged cream, a patch towards centre washed chestnut; *lesser coverts* olive-brown edged light buff. Very few moulting birds examined. *N.B.*—There is considerable individual variation in amount and distribution of black and chestnut on *greater* and *median coverts* of both sexes, but adult female and immature male never have so much chestnut on *median coverts* as adult male and sometimes chestnut is absent.

ADULT FEMALE. SUMMER.—The body-feathers (back and rump ?), some tail-feathers (in some central pair only), innermost secondaries and coverts and some median coverts are moulted from March onwards. Like female eclipse but *upper-parts* more plentifully edged and marked buff; (*under-parts*) chin and throat white; feathers of sides of body and flanks as in eclipse but edged and barred lighter buff; *tail* apparently as in eclipse; *wing* as in eclipse but innermost *secondaries* olive-brown edged and irregularly barred and marked buff, new inner *greater coverts* black-brown similarly barred and marked, new *median coverts* with black-brown centres and broadly edged buff. *N.B.*—Centre of belly subsequently appears spotted owing to plucking of feathers for nest revealing ash-brown bases. *Nest-down* is acquired in spring.

NESTLING.—Like that of Mallard but upper-parts sepia or black-brown without olivaceous tinge; long down-filaments tinged cinnamon-buff instead of olivaceous, most pronounced in region of upper-mantle; cream-buff eye-stripe extending well on to sides of crown; light patches on upper-parts cream-buff instead of light yellow as in Mallard; cheeks, sides of neck, chin, throat and fore-neck cream-buff instead of yellow-buff; line through eye narrower and streak below this line absent; remaining under-parts cream-buff, paler on breast and belly.

JUVENILE. MALE.—Like eclipse female but easily distinguished by more heavily streaked or spotted *under-parts*. (*Upper-parts*) feathers of mantle and scapulars more narrowly edged buff than in adult female, sometimes with broad straight buff bars (a few V-shaped); back and rump black-brown; lower-rump and upper tail-coverts as in adult female; (*under-parts*) feathers of upper-breast sepia tipped buff and irregularly barred and marked white; rest of breast, belly and vent white heavily spotted dusky-brown giving a streaked appearance; rest of body-plumage as in adult female; *tail* mouse-grey or sepia, feathers edged buff; *wing* as adult female but black on outer web of middle *secondaries* more extensive, barring of upper series of *median coverts* more marked, amount of chestnut on outer ones varies individually and occasionally is almost absent and is always less than in adult male. FEMALE.—As male but (*upper-parts*) mantle and scapulars scarcely barred at all, feathers with cream-buff fringes; back and rump dark sepia, feathers with lighter edges; *under-parts* and *tail* as male; *wing* as male but outer webs of middle *secondaries* with narrower black borders as adult female; *greater coverts* olive-brown tipped cream, middle ones more or less black on outer web; *median coverts* olive-brown edged cream and mostly with a buff bar, those bordering greater coverts more or less black, chestnut absent or at most indicated by faint tips to outer coverts; *lesser coverts* olive-brown fringed light buff. (See also dots on bill under " Soft Parts.")

FIRST WINTER AND SUMMER. MALE.[1]—As adult male, but *back* as in juvenile (black-brown glossed olive without frecklings); in some feathers of *breast* and *belly* freckled dusky towards tip giving a spotted appearance, in others breast and belly white; *tail* as in adult; *wing* as in juvenile but innermost secondaries mouse-grey. The juvenile body-feathers (apparently not back or rump), tail and innermost secondaries are completely moulted from autumn to March, but not rest of wings. Sometimes many juvenile feathers are retained.

FIRST WINTER. FEMALE.—As adult female but *wing* as juvenile, greater coverts usually with less black than in adult female and chestnut usually absent or merely indicated on median coverts. Moult as male but innermost secondaries do not appear to be moulted and not always all tail-feathers. FIRST SUMMER.—Like that of adult and moult apparently as in adult.

FIRST ECLIPSE. MALE AND FEMALE.—Apparently as adult eclipse.

MEASUREMENTS AND STRUCTURE.—♂ wing 260–282 mm., tail 76–93, tarsus 35–40, bill from feathers 38–45 (12 measured). ♀ wing 238–258, bill from feathers 36–42. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 3rd longest, 2nd equal or 3–7 mm. shorter, 4th 9–15 shorter, 5th 22–27 shorter, 6th 36–42 shorter; 2nd emarginated inner and 3rd outer webs. Innermost secondaries tapering (in eclipse shorter and less tapering), longest between 6th and 7th primaries. Scapulars long and pointed at tip (in eclipse broader and less pointed). Tail rounded, 16 feathers, central pair pointed. Bill shorter than head, about as deep as broad at base, sides nearly parallel but converging towards base, culmen gently concave in middle, straight and flattened anteriorly, nail abruptly decurved, lamellæ distinctly exposed.

SOFT PARTS.—Bill (ad. ♂) leaden-grey with dull orange cutting edge, (ad. ♀) dusky, on sides dull orange, (juv.) pomeranian-yellow; ♀ ad. and juv. with small dark dot or dots on lower edge of upper mandible (H. Wormald); legs and feet (ad. ♂) dull orange (paler in ♀), webs dusky, (juv.) saffron-yellow; iris brown.

[*A.C.M.* revised by *H.F.W.*]

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[1] Sometimes more coarsely barred short upper scapulars and coarsely barred feathers on sides of body and flanks make their appearance and are subsequently shed. As in other species these feathers no doubt represent traces of a lost plumage.

**Characters.**—No subspecies. Males distinguished by black and white speculum, black greater coverts and chestnut on median coverts, females by blackish-grey and white speculum and black or olive-brown greater coverts. [*A.C.M.*]

*PLATES 80, 82, 84, and 85a.*

## 319. THE TEAL—Anas crecca crecca L.

Anas Crecca Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—Europe. Restricted typical locality: Sweden).
*Querquedula crecca* (Linnæus), Yarrell, iv, p. 387; *Nettion crecca* (L.), Saunders, p. 431.
*Anas crecca crecca* L., Pract. Handb., ii, p. 277.

**Habitat.**—In breeding-season, prefers rushy moorland and heath pools, bogs, peat-mosses and the like, often breeding far from water. In autumn and winter on lakes, ponds, and reservoirs of all sorts, but preferring those with reeds or other cover, and also resorting largely to sewage-farms, flood-waters, etc., and to less extent (though at times in large numbers) to sea-coast, estuaries, and mud-flats. *B.W.T.*

**Field-characters and General Habits.**—Small size distinguishes Teal from all European breeding ducks but Garganey, and full-plumaged drakes cannot be confused, though ducks are very similar (for distinctions, see under Garganey). At long range drake appears *greyish with dark head, yellow-buff patch on either side of black under tail-coverts and whitish band along side above wing.* At close quarters vermiculated pattern of back and flanks, spotted breast, chestnut colouring of head and broad metallic-green band narrowly outlined in buff, enclosing eye and extending back to nape, can be distinguished. Belly white. Female is mottled brown with cheeks paler than crown, and under-parts more or less strongly spotted in summer, whiter in winter. Both sexes have *speculum half metallic-green and half black*, with two narrow, but distinct, white wing-bars in female, while drake has very broad and prominent (often buffish) anterior bar and only very faint posterior one. Full plumage of male complete from about Oct. to July; eclipse complete from about end July to end Aug. Eclipse and juvenile drakes are much like female, but with upper-parts rather darker and more uniform. Many immature drakes have approximately full plumage by Nov. Bill dark grey, legs greyish. Total length *c.* 14 ins.; body *c.* 10 ins.

Very agile on wing, shooting straight upwards when flushed, and flying rapidly, wheeling and swerving in almost wader-like fashion. Usually flies rather low. Walks with less facility than Mallard. Outside breeding-season in anything from pairs and small parties to flocks of a hundred or more. Males tend to gather into parties while females are incubating, but some individuals appear to remain with female even after hatching of brood. Ordinarily flies in compact flocks, though in lines when migrating. Inclined to be sluggish and inactive by day. Feeding-habits much as Mallard, *viz.* mainly nocturnal except when undisturbed. Diving by adults does not appear to have been recorded except when wounded or much alarmed; young dive well, at least when frightened. *B.W.T.*

**Voice.**—Note of male a low, far-sounding musical "krit, krit," that of female a short sharp "quack" seldom used except when alarmed, much higher and thinner than female Mallard's. Also a "conversational chuckle" on the water, and a peculiar sound like the low continued croaking of a frog has been recorded from female flushed off nest (H. L. Saxby). *B.W.T.*

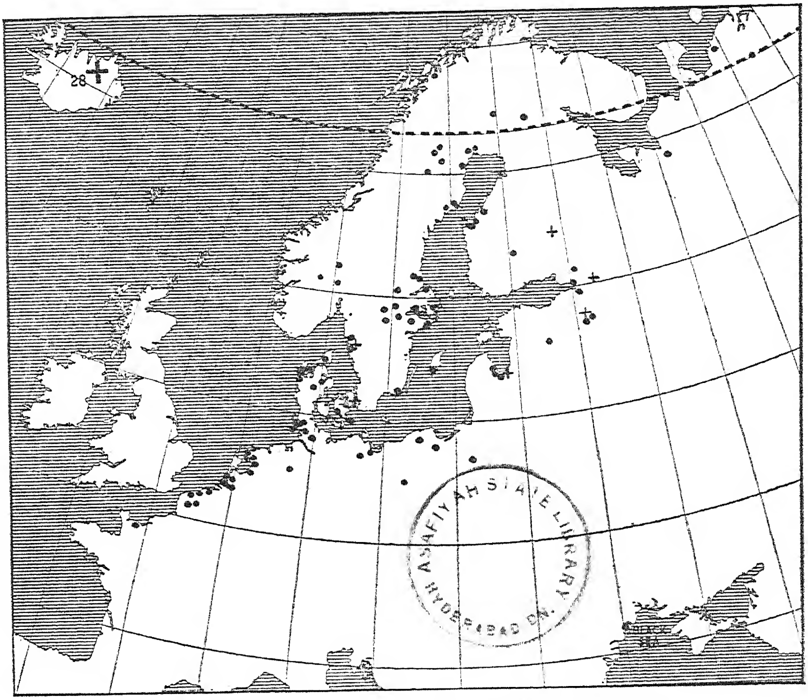
**Display and Posturing.**—Essentials of display are very like Mallard's (fig'd. Millais, p. 82). Bill is dipped as male rises in water and then drawn up centre of breast with arched neck, bird settling once more on water, finishing with momentary pause with bill somewhat raised and neck more or less extended. In mid-Apr. H. Boase observed very rapid form of this display (repeated 20 times in 10 mins.) apparently with neck retracted at end, instead of extended, head swinging back as neck shortened, finishing with bill inclined upwards and stern elevated; sometimes neck stretched out with head in line immediately after finish described. Above display may be followed as in Mallard by posture corresponding to H. Wormald's attitude 4 in that species, a sudden momentary assumption of position with stiff upright neck, bill level or rather depressed, head-feathers raised and tail erected, followed by return to normal (Boase), while Wormald describes bird in this posture making head and tail meet. Attitude 5 seldom assumed except after coition (Wormald). Commonly several males display round a duck, but actions seem often directed more to rival males than to female. Quieter and less formal advances to female also occur. Bobbing motion of head and neck also sometimes used in display, also by paired drakes to their mates. See especially Boase, *Brit. B.*, xix, pp. 162–4. "Injury-feigning" by female is common, and is also recorded by male (Millais), which sometimes takes more interest in young than most drakes. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds among heather, gorse, etc., on dry ground, in bracken-covered glades in woods, also in marshes, but often at considerable distance from any water except some tiny brook. *Nest.*—Hollow in ground in fairly good covert, sheltered by heather, gorse, bracken, bushes or growing vegetation, exceptionally off the ground in high tussock: made by duck and lined with dead leaves, dead bracken, etc., and down, which is very dark, small sprays, with light centres, but no white tips as with Garganey. Feathers, see Plate 85A. *Eggs.*—8–10 as a rule, but 11–13 and even 16 recorded: blunt ovate, smooth, pale stone-colour to light greenish-buff. Average of 100 British eggs, 45·48×33·45. Max.: 50×34·5 and 47·6×35·2. Min.: 42·5×33·5 and 43×31·3 mm. Average weight, 1·97 grams (2·5 to 1·9 gr., E. Rey). *Breeding-season.*—Usually latter part April and early May, exceptionally early April in south. *Incubation.*—By duck only, on completion of clutch: when isolated drake usually not far away. Period 21–22 days. *Fledging.*—Drake often assists duck in tending young. Period 23 days (O. Heinroth). Single-brooded. *F.C.R.J.*

**Food.**—Largely vegetable matter such as duckweed (*Lemna*) and seeds of many aquatic plants, *Potamogeton, Polygonum, Carex, Rumex, Scirpus, Panicum, Festuca, Ranunculus, Convolvulus*, etc.: also algæ, *Zostera*, and fruit of birch (*Betula*) and *Alnus glutinosa*. In winter-quarters rice also taken. Animal food includes insects (Hemiptera (*Plea*), Trichoptera (larvæ of *Phryganeidæ*), Coleoptera (*Agabus, Hydrobius*, larvæ of *Elateridæ*, etc.), and Diptera (larvæ of *Eristalis tenax*)); Annelida (worms): Mollusca (*Planorbis* and *fide* Saunders, slugs): exceptionally small Crustacea and Amphibia (frogs). *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident, passage-migrant and winter-visitor.

Breeds most English counties; sparsely southern and inland ones, more plentiful eastern and northern and in Wales. In Scotland and islands widely distributed breeding-bird. In Ireland breeds throughout in limited numbers. *H.F.W.*



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Map to show origin of Teal visiting British Islands in winter.
(Compiled from records of ringed birds by Miss E. P. Leach.)
Dots show recovery positions in breeding-season of birds ringed in winter in Great Britain. Crosses show localities where birds afterwards reported in winter in the British Islands were ringed in the breeding-season.

**Migrations.**—*British Isles.*—Recoveries of ringed birds indicate that British Teal are largely resident, wandering to some extent from their places of origin and migrating south and to Ireland under stress of weather conditions, under which circumstances they may reach N. and central France. Passage-migrants and winter-visitors from Continent (ringed birds from N.E., N. and W. Russia, Finland, Latvia, Poland, Romania, Swedish Lapland, Sweden, Norway, Iceland, N. Germany, Denmark, Schleswig Holstein, Holland, Belgium, and N. France) arrive E. and N. coasts early Sept. to end Nov. (early date Aug. 20, 1938, co. Down, juv. ringed Iceland same year) and pass to all parts Great Britain and Ireland. A good deal of wandering appears to occur and later in winter many pass on from Great Britain to Ireland and N. France and apparently occasionally back to Holland. Return passage late Mar. to early May. Winter-visitors ringed at British decoys have been recovered in winter-quarters or on passage in autumn in subsequent years in the same and other parts of British Is., Schleswig Holstein, Holland, Belgium, N., central, W. and S.W. France, N. Spain, and N. Italy. British-bred birds have been recovered as abmigrants (see note, p. 235) in Norway, Sweden, Denmark, Schleswig Holstein, and N. Russia; in the large majority of cases these birds had been hand-reared. *N.F.T.*

**Distribution Abroad.**—A Holarctic species. Typical race breeds in Europe in Iceland, Norway to 70°, Finland, N. Russia (Lower Petchora), and has nested in S. Greenland, Spitsbergen, and Færoes. Also in Asia through Siberia to about 70°. In south to Azores?, exceptionally Spain and Portugal, S. France, Corsica, Sardinia, N. Italy, Yugo-Slavia, Romania, and S. Russia to Caucasia. Also in Asia from Turkestan and Kirghiz Steppes to Altai, Semipalatinsk, Tarbagatai to China (Kansu), N.W. Mongolia, and Manchuria. Also Sakhalin, Kuriles and Aleutian Is., and Japan. Replaced in N. America by *A. c. carolinensis* (*q.v.*). Winters south to Mediterranean and its islands, also in Africa to Nigeria, Haussa Land, Sudan, and Kenya: in Asia to Aden, Socotra, Iraq, Baluchistan, India, Ceylon, Burma, Formosa, Hainan, and in the Philippine Is. Has occurred Jan Mayen, Bear Is., Novaya Zemlya, Canaries, and Madeira: also E. American seaboard from Labrador to N. Carolina. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head* and *neck*) fore-head, crown, nape, lores, cheeks, sides and front of neck chestnut, when fresh feathers of fore-head and crown with faint subterminal dusky bars and those of cheeks, sides of neck and fore-neck narrowly tipped white; chin black; thin cream line round side of base of bill over and under eye to nape, encircling wide stripe of bright metallic-green (in some lights glossed violet-purple) which extends to upper mantle; lower nape black glossed violet-purple; (rest of *upper-parts*) mantle and upper scapulars vermiculated blackish-grey and cream, lower-mantle towards centre olive-brown freckled cream, remaining scapulars mouse-grey, some with outer webs vermiculated, others cream with broad bands of velvet-black on outer web; back and rump olive-brown or mouse-grey but in some feathers of lower-rump vermiculated cream; upper tail-coverts black-brown glossed green or purple and edged buff; (rest of *under-parts*) upper-breast cream, feathers with round dusky spots towards tips; sides of body and flanks vermiculated blackish-grey and cream; breast, belly and short under tail-coverts white (belly and vent sometimes barred dusky), central under tail-coverts black, lowest ones edged white, those at side cream-buff, some with broad black subterminal bands; axillaries white; under wing-coverts white, but those at edge and bend of wing brown, margined white; *tail-feathers* mouse-grey, faintly edged light buff; *primaries* sepia, paler on inner webs; *secondaries* with outer webs velvet-black, inner webs sepia, tipped light buff, middle feathers with outer webs metallic-green (in some lights blue) and without buff tips, innermost mouse-grey, one next green *speculum* bordered velvet-black on outer web; *primary-coverts* and *bastard-wing* hair-brown; *greater coverts* hair-brown broadly tipped warm buff or white, forming conspicuous *wing-bar* varying in depth individually; innermost *greater*, *median* and *lesser coverts* hair-brown. This plumage is acquired by moult of body-feathers, tail and innermost secondaries July to Dec. Tail, which is moulted in eclipse, appears to be moulted a second time in Nov. and Dec. By summer abrasion of edges of feathers makes spots on upper-breast more pronounced.

ADULT MALE. ECLIPSE.—The body-feathers are first moulted followed by wings and tail end June to Aug. Some types of eclipse are apt to be confused with *juvenile male*, but *scapulars* are broader and with square instead of rounded tips, lower scapulars very seldom with a pronounced white tip, *under-parts* not narrowly streaked or spotted as in juvenile, *tail-feathers* new and fresh, innermost *secondaries* considerably longer. *Mantle* and *scapulars* being broadly edged and usually boldly marked buff easily distinguish *adult female* from eclipse male.

(*Upper-parts*) crown and nape as juvenile; mantle and scapulars dark brown, feathers edged lighter, some uniform except for an odd bar or so, some with broad cream or buff bars, some with whitish or buff frecklings or vermiculations;[1] back and rump olive-brown, feathers edged lighter; upper tail-coverts olive-brown, feathers edged cream; (*sides of head* and *under-parts*) as adult female, but dark streak through eye less distinct, black-brown patch on lores often absent; sides of body and flanks in some sepia edged light buff with narrow V-shaped whitish or buff bars and irregularly vermiculated white, in others more or less barred black-brown and deep pink-buff; *tail-feathers* as in winter-summer but new central pair less tapering and not projecting so far beyond rest; innermost *secondaries* olive-brown instead of mouse-grey, narrowly edged light buff on outer web and usually bordered by blackish olive-brown streak preceded by light greyish-olive one on outer web.

ADULT FEMALE. ECLIPSE.—(*Upper-parts*) crown and nape heavily streaked black, feathers edged buff; mantle and scapulars black-brown, feathers edged light cinnamon-buff and boldly marked with crescentic V-shaped or transverse bars of same, often incomplete on scapulars, which are also streaked same (sometimes barring much less pronounced); back, rump and upper tail-coverts black-brown, feathers edged cream and often with incomplete buff V-shaped bar or mark; (*sides of head* and *under-parts*) indistinct black-brown streak from lores through eye to nape (in some a cream spot on lores and patch under eye); cheeks, sides of neck, chin, throat and fore-neck light buff more or less thickly spotted or streaked black-brown; chin and throat sometimes uniform light buff; upper-breast white or light buff, feathers with crescentic black-brown markings more or less obscured by buff tips; sides of body and flanks sepia, feathers edged, streaked and barred buff or white; centre of breast and belly white; vent white, feathers marked dusky; under tail-coverts white with central streaks and spots of sepia; *tail-feathers* sepia edged and sometimes marked light buff; *wing* as male but innermost secondaries and coverts olive-brown edged cream, two next *speculum* with a border of dark olive-brown or velvety-black on outer web (in some bordered inside by narrow pale grey streak); *greater coverts* much as male; *median* and *lesser coverts* brown narrowly edged light buff. *N.B.*—Types of females occur with under-parts as heavily spotted as in summer plumage. This plumage is acquired by a complete moult July to Oct.

ADULT FEMALE. SUMMER.—The body-feathers, some tail-feathers, and innermost secondaries and coverts are moulted Feb. to May. There are two types of breeding plumage, one darker and plainer, one lighter and barred. The *darker type* has (*upper-parts*) mantle, scapulars and upper tail-coverts brown-black, feathers fringed pink-buff, some with bold crescentic markings of same; new feathers of back and rump brown-black edged pink-buff at sides of tip; (*under-parts*) crescentic markings of upper-breast black and usually less obscured by buff tips than in eclipse; sides of body and flanks sepia, feathers broadly edged and with irregular U-shaped markings of pink-buff; lower-belly and vent more spotted with dusky-brown; under tail-coverts broadly streaked same; new *tail-feathers* marked buff; new innermost *secondaries* and coverts edged buffish, that next *speculum* (and sometimes the others) streaked pink-buff. The *lighter type* has mantle and scapulars light sepia rather than brown-black, buff edges are paler and crescentic buff markings more numerous. *Nest-down* is acquired in spring.

NESTLING.—Except for its much smaller size impossible to distinguish from that of Mallard but sometimes long down-filaments of upper-parts are tipped light cinnamon-brown rather than yellowish, giving upper-parts a richer brown appearance.

JUVENILE. MALE.—*Upper-parts* rather resemble some types of male eclipse but juvenile is at once distinguished by spotted *breast* and *belly*, juvenile *tail* and shorter innermost *secondaries* usually edged light buff or white, lower stiff *scapulars* with pronounced white tips. (*Upper-parts*) crown black-brown, feathers narrowly edged cinnamon-buff; mantle and scapulars plainer than adult eclipse female with fewer and paler bars, in some scarcely barred at all; mantle appears darker, feathers with much narrower and paler buff edges; back and rump olive-brown, sometimes edged cream and barred buff as in female; *under-parts* as adult female but cheeks, sides of neck, throat and fore-neck more narrowly streaked black-brown; upper-breast with smaller sepia centres more obscured by buff edges; sides of body and flanks with fewer buff barrings; breast, belly, vent and short under tail-coverts white, feathers mostly with small dusky spots; *tail* as in eclipse female but feathers with square tips and shafts projecting; *wing* as adult male but innermost *secondaries* as in adult female, one next speculum usually with deeper border of black; white tips to *greater coverts* sometimes narrower. FEMALE.—As male, but green *speculum* not so well developed; innermost *secondaries* next speculum usually with blackish olive-brown, instead of velvety-black, border on outer web, but in some indistinguishable; *greater coverts* usually with whiter tips than in male, depth of white tips varies individually; *median* and *lesser coverts* with slightly darker centres and not so uniform as in male. (See also dots on bill under " Soft Parts.")

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[1] These variations form three types (which intergrade) with mantle and scapulars: (*a*) uniform; (*b*) barred; (*c*) vermiculated.

FIRST WINTER AND SUMMER. MALE.[1]—Not to be distinguished with certainty from adult male unless some juvenile feathers are retained. The juvenile body-feathers, tail and innermost secondaries and coverts are moulted Aug. to Dec., but not rest of wings; some juvenile body-feathers sometimes retained.

FIRST WINTER. FEMALE.—Not to be distinguished with certainty from eclipse female when all juvenile tail-feathers and innermost secondaries are shed; moult as in juvenile male, but innermost secondaries not always moulted. FIRST SUMMER.—Like adult female, but moult usually not so complete, some first winter body-feathers being retained.

MEASUREMENTS AND STRUCTURE.—♂ wing 175–192 mm., tail 62–72, tarsus 27–30, bill from feathers 34–38 (12 measured). ♀ wing 170–180, bill 31–36. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd longest, 3rd about equal, 4th 6–9 mm. shorter, 5th 14–17 shorter, 6th 25–29 shorter; 2nd emarginated inner and 3rd outer web. Inner secondaries long, pointed and a little curved outwards and about equal 5th primary, in eclipse shorter and with rounded tips. Scapulars elongated, tapering and pointed, in eclipse shorter and broader with square tips. Tail slightly rounded, central pair projecting beyond rest, 16 feathers, central pair tapering to point, rest varying individually, in some tapering to point, in others broader and less pointed. Bill slightly shorter than head, higher than broad at base, slightly broader at tip than at base, culmen sloping, concave, direct and then decurved at tip; nail oblong and very small; maxillary tomium straight anteriorly and convex posteriorly, lamellæ being thus completely hidden. Nape with a mane-like tuft.

SOFT PARTS.—Bill (ad.) dark slate-grey, (juv.) upper mandible pink-horn, under pink-yellow or flesh; ♀ ad. and ♀ juv. with small dark dot or dots on lower edge of upper mandible (H. Wormald); legs and feet green-grey to drab, webs blackish; iris dark hazel. [*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Distinguished from other species by small size, black and green speculum, and hair-brown median and lesser coverts, shafts of primaries brown. For distinctions of *A. c. carolinensis* see under that form. *H.F.W.*

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[1] In moult from juvenile to first winter and summer some birds acquire some white feathers coarsely vermiculated black-brown on sides of body and flanks, these feathers as in other ducks are subsequently shed; one bird examined had acquired some olive-brown feathers with irregular and indefinite frecklings and vermiculations of whitish, reminding one of feathers of the vermiculated type of eclipse plumage. [*A.C.M.*]

*PLATE 84.*

## 320. THE GREEN-WINGED TEAL—Anas crecca carolinensis Gm.

ANAS CAROLINENSIS Gmelin, Syst. Nat., i, ii, p. 533 (1789—Carolina to Hudson Bay).
*Nettion carolinense* (J. F. Gmelin), Saunders, p. 433.
*Anas crecca carolinensis* Gm., Pract. Handb., ii, p. 282.

**Habitat.**—Much as common Teal. In winter prefers inland sloughs, ponds, and rice-fields, but also visits coastal estuaries and mouths of streams occasionally (A. C. Bent). *B.W.T.*

**Field-characters and General Habits.**—Male resembles European Teal, but *lacks horizontal white stripe on side and has instead a vertical white mark on sides of breast in front of wing.* Females not distinguishable. Full plumage from Oct. or Nov. to July (sometimes June) ; eclipse complete from Aug. to late Sept. (A. C. Bent).

Habits as European Teal, but Bent describes it as an expert diver ; it appears, however, to employ this faculty mainly when wounded or in danger. Perches quite commonly on low dead trees or branches projecting from water (Phillips). *B.W.T.*

**Voice.**—Does not appear to differ from European Teal's ; male's described as high-pitched, short, staccato whistle, accompanied by a lower-pitched trilled note, uttered less frequently (A. A. Saunders), and female's as faint reproduction of quack of Mallard (A. C. Bent). Rarer notes on breeding-ground are described as resembling " kup-kup-kup " (when suddenly startled) and " ek-ek-ek " (F. Harper). *B.W.T.*

**Display and Posturing.**—Display resembles that of European Teal, but a peculiar and unexplained action in which a jet of water seems to pass from bill to rapidly treading feet of drake as it stands up in water, accompanied by sound like " water thrown rapidly at some object in a fine stream," has also been described (see G. M. Sutton, in Bent's *Life Histories of North American Wild Fowl*, Bulletin 126 of U.S. Nat. Mus., p. 103). Pursuit-flights of males after female occur on breeding-ground. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds at times near the edges of lagoons or on islands in lakes under shelter of bushes or small trees and long grass, but also on higher ground where there is suitable covert, up to a quarter of a mile or so from water. *Nest.*—Well concealed, in hollow of ground, lined with dry grass, leaves, etc., and down, which is described as similar to that of the European Teal. *Eggs.*—Usually 10–12, but from 6–18 recorded by A. C. Bent, who gives the average of 93 eggs as 45·8×34·2. Max. : 49×36 and 48×37. Min. : 42×31·5 and 43×31 mm. " Ovate or elliptical ovate : in colour they are dull white, cream colour or very pale olive buff." *Breeding-season.*—In U.S.A. from May 6 onward, but mostly in second half of May : in N. Canada from May 21 onward and Alaska early in June. *Incubation.*—Begins with completion of clutch : by duck alone : drake deserting her when incubation begins. Period 23–24 days (in confinement, A. F. Moody and J. C. Laidlay). *Fledging.*—Young tended by duck only : a devoted mother. Single-brooded. *F.C.R.J.*

**Food.**—Mainly vegetable matter, according to D. C. Mabbott 90·67% (sedges 38·82%, pond-weeds 11·52%, etc.), but also wild rice, grain, berries, wild grapes, chestnuts, acorns, nuts, etc. Animal matter (9·33%) includes Mollusca, Crustacea, tadpoles, and it is said occasionally putrid salmon. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Four or five. Adult male Kingsbridge estuary (Devon), Nov. 23, 1879 (H. Nicholls, *Zool.*, 1880, p. 70). Adult male near Scarborough (Yorks), Nov., 1851 (J. Evans, *op. c.*, 1852, p. 3472). One stated to have been shot Hurstbourne Park (Hants) about 1840 (A. Fellowes, *op. c.*, 1880, p. 70). Adult male near Levens (Westmorland), Dec. 26, 1936 (H. W. Robinson, *Brit. B.*, xxx, p. 378). Adult male N. Uist (O. Hebrides), Oct. 24, 1938 (J. W. Campbell). *H.F.W.*

**Distribution Abroad.**—Breeds from N. Alaska, Mackenzie, Gt. Slave Lake, N. Manitoba, James Bay and S. Ungava, south to central California, N. Nevada, Utah, New Mexico, Nebraska, S. Minnesota, N. Michigan, S. Ontario, New York, and Quebec. Winters south to Bahamas, W. Indies, Honduras, and S. Mexico. Casual in Greenland, Bermuda, Hawaii, and Japan (*A.O.U. Check-List*). *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—Like *A. c. crecca* but cream line on *sides of head* much restricted, extending under and in front of eye but not above green stripe and only faintly indicated at sides of bill; *mantle* and *scapulars* more finely vermiculated dark grey and cream, scapulars with no uniform cream, some with black bands on outer web; broad white crescent on *side of breast* in front of shoulder; *sides of body* and flanks more finely vermiculated; black border on outer web of *innermost secondary* bordering *speculum* narrower and not extending so far towards tip. Moult presumably as in *A. c. crecca*.

ADULT MALE. ECLIPSE.—As female but feathers of *mantle* and *scapulars* without pale edgings and upper-parts thus more uniform; *under-parts* as female but some concealed black spots on breast. Usually a few vermiculated feathers on mantle or lower flanks (J. C. Phillips).

ADULT FEMALE. ECLIPSE AND WINTER AND SUMMER.—Apparently not to be distinguished from female *A. c. crecca* and moults as in *A. c. crecca*. Hardly any females in winter-summer plumage examined.[1]

JUVENILE.—Not to be distinguished from males of *A. c. crecca*.

FIRST WINTER AND SUMMER. MALE.—As males of *A. c. crecca*, but distinguished by same characters as in adults. As in *A. c. crecca* coarsely vermiculated feathers (subsequently shed) appear on sides of body and flanks. FEMALE.—Not to be distinguished from *A. c. crecca*.

MEASUREMENTS AND STRUCTURE.—♂ wing 179–191 mm., tail 65–73, tarsus 27–30, bill from feathers 34–37 (12 measured). ♀ wing 172–183, bill 33–36. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd and 3rd about equal and longest, 4th 5–7 mm. shorter, 5th 14–18 shorter, 6th 22–30 shorter. Other structure as in *A. c. crecca*.

SOFT PARTS.—Bill (ad. ♂) black, (ad. ♀) brownish; ♀ with dark dots on bill as Teal (H. Wormald); legs and feet pale brown to greyish-fawn, darker at joints and on webs; iris brown. [*A.C.M.* revised by *H.F.W.*]

*PLATES 82, 84, and 91.*

## 321. THE BLUE-WINGED TEAL—Anas discors L.

ANAS DISCORS Linnæus, Syst. Nat., ed. xii, i, p. 205 (1766—Carolina to Virginia).
*Querquedula discors* (Linnæus), Saunders, p. 434; Yarrell, iv, p. 391 (in text).
*Anas discors* L., Pract. Handb., ii, p. 283.

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[1] Mr. J. C. Phillips (*Nat. Hist. of Ducks*) observes that the buff wing-bar (formed by tips of greater coverts) in the American bird is usually of a deeper colour especially on the outer part than it is in the European form. *H.F.W.*

**Habitat.**—In breeding-season largely frequents quite small ponds and pools in wide variety of country, but also larger fresh waters. In winter-quarters largely rice-fields and extensive marshes (A. C. Bent), but is fond of quite small pools and ditches. *B.W.T.*

**Field-characters and General Habits.**—Size of Garganey. Male distinguished by *dark, grey-brown head with white crescent in front of eye.* Back red-brown with black and buff markings. Speculum in drake metallic-green with white band in front, in female much duller, with bar buffish and inconspicuous; *fore-wing lapis lazuli blue* (same colour as in Shoveler, not blue-grey like Garganey). Female much like Garganey, but with blue of fore-wing only a little duller than in male and hence easily identified. Eclipse begins in July, is complete in Aug., and, as in Garganey, is long retained by adults, full plumage being seldom acquired before mid-winter and sometimes not till Mar. (A. C. Bent). Total length *c.* 15 ins.; body *c.* 10½ ins.

In habits is American counterpart of Garganey. Generally swims and flies in compact flocks. Flight swift. Perches freely on tree-trunks or roots in flooded places (Phillips). Feeds mainly on surface or within reach of submerged head and neck, but sometimes "up-ends" (Bent). Only dives when greatly frightened or wounded, and then only indifferently (Phillips). *B.W.T.*

**Voice.**—Generally silent. Male's note described as a faint lisping or peeping (A. C. Bent) or a high-pitched sort of squeak (Phillips); duck's is a quacking note described as faint by Bent, but by Phillips as high-pitched and coarse. Also constant frog-like chattering, mixed with mouse-like squeaks and occasional quack, from feeding birds (Phillips). *B.W.T.*

**Display and Posturing.**—Display consists of active bobbing of head up and down and at same time a little forward and backward. Female will go through same motions, though less vigorously (Phillips). Pursuit-flights are common, participants, according to E. E. Thompson, being generally a male and two females. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds near prairie sloughs and lakes, usually on dry ground among long grass, or catstails: sometimes on islands and occasionally well back from the water-side. *Nest.*—Well concealed by vegetation, in hollow in ground lined with dead grass, to which down is added as incubation progresses. Down described as larger and lighter than that of Green-winged Teal, with large whitish centres. (For feathers see Plate 91.) *Eggs.*—Usually 10–12, but 6–15 on record: ovate or elliptical ovate, dull white, light cream or pale olive-white. Average of 93 eggs (by A. C. Bent), 46·6×33·4. Max.: 49·5×35 and 47·2×36·2. Min.: 43·5×32 and 45·6×31·3 mm. *Breeding-season.*—In U.S.A. from May 8 onward, but mostly towards end May; in N. Canada from early June onward. *Incubation.*—By duck only, begins with completion of clutch. Period 23–24 days (in confinement, A. F. Moody and J. C. Laidlay). *Fledging.*—Young tended by duck only: drake takes no share but duck a devoted mother. Single-brooded. *F.C.R.J.*

**Food.**—Both animal and vegetable matter taken, but estimates of proportions vary. J. C. Phillips gives animal, 88%; vegetable, 12%: D. C. Mabbott, animal, 29·47%; vegetable, 70·53%. Animal matter includes Mollusca (16·8%), Crustacea (1·93%), and insects (10·41%): vegetable matter comprises sedges, pond-weeds (*Naiadaceæ*), grasses, *Polygonaceæ*, etc. *F.C.R.J.*

**Distribution.**—*British Isles.*—Six. Female Upper Nithsdale (Dumfries), 1858 (Saunders, p. 434, *Birds Dumfries.*, pp. 276–8, *addenda*, p. 21). Female Dee estuary (Cheshire), about 1860 (*Vert. Fauna Cheshire*, p. 332). Immature female (probably wild bird) Ballycotton (Cork), Ireland, Sept., 1910 (*Bull. B.O.C.*, xxvii, p. 15; *Brit. B.*, iv, p. 252). Male Anglesey early 1919 (*Brit. B.*, xiii, p. 85). Male Wexford Slob, Aug. 16, 1930 (*op. c.*, xxiv, p. 195). Female Tervoe near Limerick, Nov. 4, 1932 (*Irish Nat. J.*, 1933, p. 154). *H.F.W.*

**Distribution Abroad.**—Nearctic region. Breeds from central British Columbia, Gt. Slave Lake, N. Saskatchewan, Manitoba, S. Ontario, New Brunswick, etc., south to New York, Ohio, Indiana, Illinois, Missouri, Kansas, New Mexico, Utah, and N. Nevada. Winters south to Bahamas, W. Indies, Venezuela, French Guiana, Brazil, and Chile. Accidental Greenland, Bermuda and Denmark (*A.O.U. Check-List*), also Holland. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head* and *neck*) fore-head, lores and crown black-brown; in front of eye wide white stripe extending in crescentic shape almost to throat and more or less outlined black-brown; chin and throat dark sepia; cheeks, sides of neck, nape and fore-neck deep plumbeous, in some lights glossed pale magenta-pink; (*upper-parts*) mantle and upper scapulars sepia glossed dull green, feathers narrowly edged and with crescentic and U-shaped irregular markings of buff; some scapulars olive-brown glossed blackish-green with buff shaft-streak, some with outer webs more or less pale blue; back and rump olive-brown glossed dull green, feathers with lighter edges (in some edged pale slate-blue); on either side of rump patch of white; upper tail-coverts black-brown glossed dull greenish-black; (*under-parts*) breast, belly and vent deep pink-buff, spotted profusely black-brown; sides of breast and flanks deep pink-buff with larger spots of black-brown, lower flank-feathers barred black-brown; under tail-coverts black; axillaries white; under wing-coverts white, at edge and bend of wing dusky-brown; *tail-feathers* sepia faintly edged light buff; *primaries* sepia, paler on inner webs; *secondaries* sepia, outer webs sometimes tipped white, middle ones metallic blue-green on outer web forming *speculum*, innermost sepia glossed olive, outer webs velvety blackish-green, shafts brownish-white; *bastard-wing* and *primary-coverts* sepia, but *median* and *lesser primary-coverts* tipped pale blue; *greater coverts* white with sepia bases, inner ones sepia tipped pale blue, innermost sepia tinged dull green, outer webs more or less shaded pale blue towards tip;[1] *median* and *lesser coverts* pale blue. This plumage is acquired by a moult in autumn and winter. SUMMER.—One or two specimens examined were moulting odd body-feathers. Coloration as winter.

ADULT MALE. ECLIPSE.—The body-feathers and probably innermost secondaries are moulted in late summer. *Upper-parts* as juvenile male, *under-parts* as adult female, *tail* and *wing* as adult male. (*Upper-parts*) crown as in female, but darker, feathers with fewer buff edges; nape as in juvenile; mantle and scapulars black-brown as juvenile, feathers with narrow pink-buff fringes, some of those of mantle with small crescent-shaped buff mark towards tip; back and rump black-brown glossed dark green; upper tail-coverts as juvenile; rest of head and neck as in adult female, but a dark streak from base of upper mandible through eye to nape; remaining *under-parts* as in adult female; *tail* and *wing* as in adult male. *N.B.*—Only one specimen in eclipse examined (♂ Aug. 9, 1911, Kansas, Brit. Mus.).[2]

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[1] There is considerable individual variation in coloration of greater coverts; distal halves of outer and middle feathers are usually pure white, but in some (apparently adult males) inner webs have oval sepia spots. [*A.C.M.*]

[2] Does not entirely lose crescentic white face stripe until late summer although this becomes obscure. Eclipse carried into Sept. and Oct. (J. C. Phillips).

ADULT FEMALE. ECLIPSE.—(*Upper-parts*) fore-head and crown black-brown, feathers edged buff; nape buff narrowly streaked dusky; rest of upper-parts black-brown, feathers edged light buff, and a few with buff markings; (*sides of head* and *under-parts*) loral spot white (in some streaked dusky); cheeks, sides and front of neck light buff narrowly streaked dusky; black-brown streak from eye to nape; chin buffish-white; upper-breast dusky-brown, feathers with broad fringes and numerous markings of buff; remainder of breast, belly, vent and under tail-coverts whitish or pink-buff heavily streaked or spotted dusky-brown, these markings more or less concealed; sides of breast and flanks sepia with buff markings and fringes; axillaries, under wing-coverts and *tail* as male; *wing* as in male but *speculum* much duller with slight green gloss, outer webs of middle *secondaries* sepia tinged dull green, innermost secondaries sepia, only tinged dark olive-green, and narrowly edged cream on outer webs; *greater coverts* apparently not with distal halves white as male, outer ones sometimes with outer webs white towards tip, inner webs with large oval sepia mark, rest with sepia tips tinged pale blue, narrowly tipped white and often with one or two white bars; *median* and *lesser coverts* as male. This plumage is acquired by complete moult in autumn.

ADULT FEMALE. WINTER AND SUMMER.—Coloration as in eclipse but feathers of *crown* more broadly edged buff; *upper-parts* darker, feathers more broadly edged light buff and mostly with U-shaped buff bars; new *tail-feathers* with broader edges and with irregular markings of pink-buff. Insufficient material available to determine moult.

NESTLING.—Pattern and coloration differ from *A. c. crecca*. Upper-parts sepia, down with long golden tips; bar across wing and streak on either side of back from below wing extending to yellow patch at side of uropygial tuft, cream-yellow; fore-head, cheek and broad eye-stripe sulphur-yellow; sepia line from upper mandible through eye to nape discontinuous in front of eye; below this line a sepia streak extending half-way from nape to eye; sides of body and under-parts cream-yellow. (Only one examined.)

JUVENILE. MALE.—Like eclipse female but (*upper-parts*) mantle and scapulars without buff bars; back and rump black-brown glossed dull green, feathers with deep plumbeous edges; (*under-parts*) chin and throat light buff usually speckled dusky; upper-breast streaked ash-brown, feathers with long yellowish-white fringes; sides of body and flanks light sepia edged and with irregular bar of yellow-buff; breast, belly, vent and under tail-coverts light greyish streaked or spotted pale dusky; *tail* and *wing* as adult male, but innermost *secondaries* and coverts sepia edged buff, glossed black-green on outer webs; *speculum* sometimes duller than in adult; *greater coverts* as adult but distal halves usually with less white, inner webs of outer coverts sometimes with oval dusky spot at tip. FEMALE.—As male; *wing* as adult female but outer webs of innermost *secondaries* tinged olive rather than dark green.

FIRST WINTER AND SUMMER. MALE.—As adult male but *greater coverts* usually with less white and inner webs usually with more numerous oval sepia markings. The juvenile body-plumage (not back or rump), tail and innermost secondaries are moulted from Aug. onwards. FEMALE.—Apparently not to be distinguished from adult female.

MEASUREMENTS AND STRUCTURE.—♂ wing 180–196 mm., tail 61–72, tarsus 28–31, bill from feathers 38–44 (12 measured). ♀ wing 175–192, bill 38–40. Primaries: 1st narrow, pointed and rather more than half longest primary-covert, 2nd and 3rd about equal and longest, 4th 4–7 mm. shorter, 5th 12–15 shorter, 6th 19–28 shorter; emargination as in Teal. Innermost secondaries long and pointed, longest about equal to 6th primary. Shafts of long tapering scapulars extending beyond rest of feathers in adult ♂, but in eclipse ♂, ad. ♀, and juveniles scapulars rounded at tip. Tail rather pointed, 14 tapering feathers. Bill slightly longer than head, maxillary tomium sinuated so as to expose distinctly lamellæ of basal half, terminal half of culmen slightly but distinctly convex. Other structure as in Teal but mane-like tuft on nape lacking.

SOFT PARTS.—Bill (♂) uniform black, (♀) upper black, lower black-brown, sides of upper mandible usually with dark dots; legs and feet (♂) yellowish, webs dusky-grey, ♀ duller; iris brown. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Small size and pale blue median and lesser wing-coverts distinguish species in all plumages; shafts of primaries brown. *H.F.W.*

*PLATES 80, 82, 84, and 85a.*

## 322. THE GARGANEY—Anas querquedula L.

ANAS QUERQUEDULA Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—Europe. Restricted typical locality: Sweden).
*Querquedula circia* (Linnæus), Yarrell, iv, p. 393; Saunders, p. 435.
*Anas querquedula* L., Pract. Handb., ii, p. 286.

**Habitat.**—In breeding-season prefers reedy meres and ponds, swampy pools and other shallow waters with rich vegetation, fens, marshes and water-meadows with creeks, ditches, or pools. In Europe not often seen on sea, though it will resort to brackish waters and in India apparently visits coasts and salt-water creeks quite commonly. *B.W.T.*

**Field-characters and General Habits.**—Size approximately as Teal (actually a little larger). Outstanding feature of drake Garganey at any distance is *broad white band extending from eye to nape.* General colour is mottled brown with fine crescentic pencillings on breast. *Sharp demarcation of brown breast from vermiculated greyish flanks and white belly* is noticeable both at rest and on wing, but more prominent character in flight is *pale blue-grey fore-wing*, and this at once separates drake from Teal even when in eclipse. Long curved scapulars banded lengthwise blue-grey, black and white overhang wing; speculum metallic-green bordered white in front and behind. Duck closely resembles Teal, but has *only very obscure speculum,* which distinguishes her on wing from that species; the wing is also rather greyer than female Teal's, but not sufficiently so to be very noticeable. Longer neck in flight and slighter build are other points of difference, but rather fine ones. On water duck generally looks paler than duck Teal, but can only be definitely distinguished at close range by pure white instead of speckled brownish throat, whitish spot at base of bill and more distinct superciliary stripe. Drake assumes eclipse about same time as Teal, but retains it much longer, full plumage being sometimes not complete till Feb. Eclipse of drake is much like female except for wings, and juveniles are similar except that wing of juvenile male is duller than adult. Young drakes colour up slowly, not assuming mature plumage till about Mar., if then, many having this plumage still incomplete when moult to eclipse begins (Millais). Total length *c.* 15 ins.; body *c.* 10½ ins.

General habits in many ways recall Shoveler's. Flight rapid, but generally without the sudden turns and downward plunges of Teal. In Europe commonly seen in pairs or small parties only, though in Mediterranean countries great numbers often occur on passage, several hundreds being sometimes present on a single lake; great numbers also occur in India in winter. Flocks tend to pack both on water and in flight. Does not usually "up-end" much, and is stated to dive only when wounded. *B.W.T.*

**Voice.**—Spring note of male is a peculiar low crackling sound. Note of female is a " quack " or " knāk " like female Teal's. Male has been stated to use a similar note in autumn and winter, but this lacks confirmation. Phillips has heard very low " tick " from male and both sexes have quiet chattering notes, as in other ducks. Female has also a soft, high, repeated squeak when excited (O. Heinroth). *B.W.T.*

**Display and Posturing.**—Courtship is undemonstrative and almost precisely similar to Shoveler's; male swims closely round female, spreading long scapulars and ruffling head-feathers and both birds also perform peculiar " spin " round each other, head to stern, allowing water to rush through their bills. Head may be moved backwards and forwards as well as up and down and crackling note is uttered at maximum extension of neck. Pursuit-flights of several males after a female are regular in breeding-season and end according to Naumann in female pitching quietly with last remaining competitor, as is asserted by Christoleit to happen with Mallard (*q.v.*). *F.C.R.J. & B.W.T.*

**Breeding.**—In England usually breeds in long mowing grass in meadows near marsh or open water, but also at times concealed among rank grass on bank adjoining pool or even in big tussock of rushes surrounded by water. *Nest.*—In hollow of ground, lined grasses and characteristic down, which alone serves for identification: sprays smaller than those of Teal and with prominent pure white tips as well as centres. (For feathers see Plate 85A.) *Eggs.*—7–12, but 10–11 usually, 12–14 also recorded: ovate, smooth, warm creamy-buff, without the greenish cast as in Teal's eggs. Average of 53 British eggs, 45·31×33·2. Max.: 49·2×32·9 and 44·3×35·6. Min.: 43·5×32 and 45×30 mm. Average weight, 1·94 grams (2·2 to 1·4 gr., E. Rey). *Breeding-season.*—From last week April and early May onward. *Incubation.*—By duck alone: begins on completion of clutch: drake at hand during early stages. Period 21–23 days (in confinement, J. C. Laidlay and H. Wormald). *Fledging.*—Young tended by duck only. Single-brooded. *F.C.R.J.*

**Food.**—Animal as well as vegetable: former category includes young and spawn of fish and frogs (Naumann): Crustacea (*Talitrus*), Mollusca (*Planorbis*, *Anodonta*, etc.), Annelida (worms), Hirudinea (leeches), insects (Hemiptera (*Naucoris*), Trichoptera (larvæ of *Phryganeidæ*), Coleoptera (water-beetles, *Cyclonotum*, *Dryops*, *Haliplus*, *Hydrobius*), etc.). Vegetable matter includes buds, leaves, roots or seeds of many water-plants, such as *Potamogeton*, *Sparganium*, *Scirpus*, *Carex*, *Glyceria*, *Juncus*, *Nymphæa*, *Polygonum*, *Rumex*, *Ranunculus* (A. J. Jäckel): also *Phragmites* and *Lemna*. Sea-weed has been recorded on coast, and rice in winter-quarters in India. *F.C.R.J.*

**Distribution.**—*England.*—Summer-resident (3rd week March and April to Sept., sometimes Oct.), occurs exceptionally between Nov. and Feb. Appears to be increasing slightly. Breeds regularly in small numbers in Norfolk, Suffolk, Cambridge, Essex, Kent, and in recent years in Dorset and Hants, and probably regularly in Sussex. Has also bred Cumberland (1929, G. H. Lings, probably due to introduction), Durham (1880–7), Yorks (1882, 1908, 1926), Lincs (1914), Herts (1928, 1931), Somerset (1910, 1930, 1933, 1936, ? 1937), Gloucester (1928, 1930, 1934, probably 1937, possibly intervening years). Elsewhere scarce visitor, usually spring, fairly regular Cornwall and Cheshire and Staffs, but otherwise occasional, and rare in north. *Wales.*—Bred Anglesey (1936, S. W. P. Freme), otherwise rare visitor. *Scotland.*—Bred Forth area 1928, otherwise rare visitor, has occurred many parts, including I. and O. Hebrides, Orkneys and Shetlands, but not in Inverness or north of Loch Ness on mainland. *Ireland.*—Rare straggler. One ringed Friesland (decoy) Aug. and recovered Tipperary, Nov., is only evidence of migration to this country in autumn of Continental bred birds. *H.F.W.*

**Distribution Abroad.**—Palæarctic region. Breeds in Europe north to Iceland, about 64° in Sweden, central Finland, N. Russia (Solovetski Is., Archangel Govt., east to Urals): in Asia, through Siberia to the Pacific, north to 62° on R. Lena. In south to S. France (exceptionally S. Spain), central Italy, Albania, Bulgaria, and in Russia to Crimea and Caucasia. Also Sardinia, Tunisia, Cyprus, and Naxos recorded: from Aralo-Caspian region to Altai, Semipalatinsk, Tarbagatai, Mongolia, and Manchuria. On passage in Mediterranean and N. Africa to tropical Africa, Senegambia to Congo and Nyasaland: Seychelles, all southern Asia, Philippines, Papua, Celebes, Sula Is., Moluccas. Accidental in Færoes, Norway, and Australia. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head and crown black-brown, feathers with narrow whitish shaft-streaks; broad white superciliary stripe extends from front of eye to nape; nape ash-brown, feathers with white shaft-streaks; mantle and back black-brown, feathers fringed greyish-olive; feathers at sides of upper-mantle barred as breast, feathers towards centre freckled cream; scapulars pale lavender-grey edged white, longer ones dark green, some with outer webs deep grey and with broad white shaft-streaks, under ones olive-green or olive-brown edged white, some with ash-white shaft-streaks; rump and upper tail-coverts dark sepia, feathers with irregular wavy and U-shaped bars of light buff and edged same or greyish-olive; (*under-parts*) chin and throat black; lores, cheeks, sides and front of neck auburn, feathers with narrow white shaft-streaks; breast pink-buff, feathers with black-brown bars, U-shaped on upper-breast, transverse on lower-breast; sides of body and flanks white with numerous wavy black bars; lower flanks broadly tipped grey; belly and vent white with dusky-brown wavy bars and frecklings (sometimes belly white); under tail-coverts white spotted sepia; axillaries white; under wing-coverts white, those at edge and bend of wing dark grey; *tail-feathers* sepia narrowly edged white often with buff markings and tips; *primaries* sepia, paler on inner webs; *secondaries* light sepia broadly tipped white, outer ones with outer webs pale lavender-grey, middle ones with outer webs dull green (*speculum*), innermost olive-brown, on outer webs blackish-green edged white, one next *speculum* tinged pale green-grey on outer web; *primary-coverts* sepia, inner ones pale grey on outer webs; *bastard-wing* pale sepia; *greater coverts* pale mouse-grey broadly tipped white, inner ones suffused pale lavender-grey, and narrowly tipped white, innermost with inner webs sepia; rest of *wing-coverts* pale lavender-grey. This plumage is acquired by a body-moult (apparently tail is moulted again), also innermost secondaries Aug. to Feb., exceptionally March.

ADULT MALE. ECLIPSE.—The body-feathers are first moulted followed by wings and tail June to Aug. Distinguished from adult female by lavender-grey *wing-coverts* and from juvenile male by innermost *secondaries* and broader white tips to *greater coverts* (juvenile has wing-coverts duller, under-parts mottled and typical juvenile tail). (*Upper-parts*) crown, nape, mantle, scapulars and upper tail-coverts as in female, but upper tail-coverts often with a V-shaped buff bar; back and rump olive-brown, feathers edged olive-grey; *under-parts* as adult female but feathers of sides of body and flanks usually with a white mark along shafts, or with irregular white barrings; *tail* and *wing* as winter-summer male, but innermost *secondaries* with square or slightly rounded, instead of pointed, tips.

ADULT FEMALE. ECLIPSE.—(*Upper-parts*) crown black-brown, feathers edged cinnamon-buff; nape ash-brown; remaining upper-parts dark sepia, scapulars, back and rump tinged olive, feathers edged light buff, upper tail-coverts sometimes freckled cream; (*sides of head* and *under-parts*) spot on lores cream-white, more or less well-defined sepia streak from above lores through eye, and above it from back of eye to nape an irregular white streak; cheeks, sides of neck and fore-neck light buff, narrowly streaked black-brown; chin and throat white; feathers of upper-breast, sides of body and flanks sepia broadly fringed white or light buff, sepia centres partially obscured on breast; centre of breast, belly and vent white usually with numerous sepia marks, more or less concealed by long white fringes; under tail-coverts white with sepia markings; *tail* as male; *wing* as male but *speculum* with less green gloss, in some green gloss hardly apparent; innermost *secondaries* sepia edged white and glossed dull olive, one next speculum without grey tinge; *greater coverts* ash-brown with much narrower white tips; *median* and *lesser coverts* ash-brown, in some narrowly edged greyish, more or less suffused with varying amount of dull lavender-grey. This plumage is acquired by complete moult Aug. to Jan.

ADULT FEMALE. SUMMER.—Most body-feathers, down, usually all tail-feathers, some innermost secondaries and coverts (tail-feathers and innermost secondaries are not always moulted) are moulted March to May. Coloration as eclipse, but feathers of *crown* and *nape* plentifully edged buff, those of *mantle, scapulars, back* and new innermost *secondaries* with broad pink-buff fringes, not narrowly edged light buff as eclipse; new *upper-tail coverts* sepia edged and with irregular pink-buff markings; *flank-feathers* as eclipse, but more or less irregularly marked with white or buff; new *tail-feathers* sepia with streaks and irregular markings and broad edges of pink-buff. *Nest-down* is acquired in spring.

NESTLING.—Similar to nestling Mallard and Teal but lower line on side of head continued to base of upper mandible (in some this line is interrupted) and connected just in front of eye with upper line; light yellowish spot on lores; belly and vent greyish-yellow instead of cream-yellow.

JUVENILE. MALE.—Like eclipse female but easily distinguished by mottled or streaked *under-parts*, juvenile *tail* and duller *wing-coverts*. *Upper-parts* as adult female but feathers of mantle smaller and buff edges less pronounced; scapulars narrower, edged cinnamon-buff instead of light buff as are upper tail-coverts; feathers of back and rump edged pale olive-grey; rest of head and neck as adult female but streaks narrower; (*under-parts*) feathers of upper-breast, sides of body and flanks sepia broadly edged cinnamon-buff; feathers of rest of breast, belly and vent with ash-brown centres partially concealed by light buff or white tips producing mottled or streaked appearance; under tail-coverts sepia edged light buff; *tail-feathers* sepia edged light buff; *wing* as adult male but innermost *secondaries* and *coverts* sepia, sometimes tinged olive edged cream or buff, *greater coverts* usually with narrower white tips, *median* and *lesser coverts* duller lavender-grey, some tipped dusky-brown. FEMALE.—As male, but wing like adult female though *speculum* usually pale brown with little or no green gloss; *secondaries* with narrower white tips; *wing-coverts* sepia or ash-brown, *greater coverts* with narrower white tips, *median* and *lesser* faintly edged ash-white with little or no lavender-grey suffusion. (See also dark dots on bill under "Soft Parts.")

FIRST WINTER AND SUMMER. MALE.—As adult and when full plumage is assumed only to be distinguished by narrower white tips to *greater coverts* and duller *median* and *lesser coverts* and more worn appearance of wing. The juvenile body-feathers, tail (apparently in some central pair only), innermost secondaries and coverts are moulted from late autumn (Oct. and Nov.) to spring. Sometimes some juvenile body-feathers are retained until assumption of eclipse plumage.

FIRST WINTER. FEMALE.—As adult female eclipse but distinguished by narrower white edges to juvenile *greater coverts* and browner *wing-coverts* without or with little lavender-grey suffusion and usually with no green gloss on *speculum*. Moult as male. FIRST SUMMER.—As adult summer, but *tail* and innermost *secondaries* appear to be more rarely renewed. Distinguished from adult by wing as in first winter.

MEASUREMENTS AND STRUCTURE.—♂ wing 187–198 mm., tail 62–70, tarsus 26–30, bill from feathers 36·5–40 (12 measured). ♀ wing 175–194, bill 34–39. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 2nd and 3rd about equal and longest, 4th 4–8 mm. shorter, 5th 12–17 shorter, 6th 22–29 shorter. Innermost secondaries long and pointed and shorter than 5th or 6th primaries, in eclipse with square or rounded tips. Scapulars long and tapering, in eclipse short, with square or slightly rounded tips. Bill as in *A. discors* but tomium hardly sinuated, other structure as in *A. c. crecca* but nape without mane-like tuft.

SOFT PARTS.—Bill (ad. ♂) dull black, (ad. ♀) greenish-grey, greyish-brown on top of culmen; ♀ ad. and juv. with small dark dot or dots on lower edge of upper mandible (H. Wormald); legs and feet dull leaden-grey to ash-grey; iris umber-brown. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Small size, green speculum without any black and pale lavender-grey median and lesser coverts distinguish males from allied species, while absence of black in speculum and ash-brown wing-coverts distinguish female in all plumages. Shafts of primaries white. [*A.C.M.* revised by *H.F.W.*]

*PLATES 80, 82, 85, and 85a.*

## 323. THE WIGEON—Anas penelope L.

ANAS PENELOPE Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—Europe. Restricted typical locality: Sweden).
*Mareca penelope* (Linnæus), Yarrell, iv, p. 397; Saunders, p. 437.
*Anas penelope* L., Pract. Handb., ii, p. 290.

**Habitat.**—Typical haunts in breeding-season are northern lochs, rivers, and fresh waters, both on open moorlands, marshes or tundra, and in cultivated or wooded country, with a partiality for the last; breeding under rather untypical conditions on marshes or waters in southern parts of Gt. Britain probably due to descendants of pinioned birds. Outside breeding-season mainly maritime, frequenting chiefly muddy coasts and estuaries, especially where *Zostera* abounds, but a good many winter regularly on larger lakes, reservoirs, flood-waters, etc., inland. Will visit fields and grasslands to feed. *B.W.T.*

**Field-characters and General Habits.**—At a distance colour-scheme of drake, with *chestnut head appearing markedly darker than mainly grey body, and white mark along sides*, presents some superficial resemblance to that of considerably smaller Teal, but *yellow-buff fore-head and crown—creamy-white in strong light*—are distinctive. At closer quarters is unmistakable: vermiculated grey back and flanks, pinkish-brown breast and black under tail-coverts bordered by pure white area in front. The white mark on sides is due to *broad white patch on wing-coverts*, partly concealed by flank-feathers, and this is distinctive feature of drake in flight, Wigeon drake being only British duck (except very rare American Wigeon) which shows *white patch on front* *of wing*. Usually keeps neck more or less retracted, appearing short-necked, compact bird. Female, intermediate in size between Mallard and Teal, differs from other surface-feeding ducks in small, short bill, more rufous plumage and pointed tail. Speculum, margined above (in closed wing) by white, is dark green broadly bordered black in male, dusky, with little or no green and enclosed between white wing-bars in female. White belly of both sexes is also noticeable on the wing. Duration of full and eclipse plumages of drake somewhat variable: full plumage complete as early as Oct., or not until end Nov. or even later, moult to eclipse starting at any time from beginning June to beginning July, and change back to full plumage about mid-Aug. (Millais). Male in eclipse resembles female, but crown and upper-parts duskier, and flanks richer in colour, and retention of characteristic wing-pattern with white shoulders at once proclaims his sex. Juvenile males are much like females, with fore-wing grey-brown, not white: they begin to show change in Oct. and adult plumage is complete in some as early as Mar., but most retain the grey-brown fore-wing up to and during the eclipse, and young males will breed in this incomplete plumage (Millais). Bill blue-grey with black tip; legs greyish to brownish. Total length *c.* 18 ins.; body *c.* 12 ins.

Flight rapid, though not as swift as Teal and Garganey, rising straight up off water and twisting and swerving to some extent, but not as much as first-named species. The rather long, narrow wings are more depressed below body at the down-stroke than in Mallard. A tendency to "brake" in mid-air is responsible for fluttering sound produced by flocks passing overhead. Walks with ease and can run well. Thoroughly gregarious and usually seen in parties or flocks; often seen resting off shore by day in compact flocks of many hundreds, which preserve a close formation in flight, though migrating flocks tend to straggle out into irregular lines. Does not associate much with other ducks, but often accompanies Brent Geese (and in O. Hebrides Whooper Swans: J. W. Campbell) to feed on debris of *Zostera* left by the larger birds. Like Mallard is not by preference a nocturnal feeder, but becomes so through persecution, "flighting" at dusk to feeding-grounds, which on coast are chiefly *Zostera*-grown flats, where the birds paddle or wade in the shallows, rooting up the weed, or land where the beds are uncovered by the tide. Will feed by "up-ending" where necessary, but is less addicted to this practice than most surface-feeding ducks. Comes to land freely and often feeds regularly on grasslands and grassy banks of pools, especially in spring. M. Christy has recorded diving by pinioned Wigeon and wounded birds dive readily, but diving for food appears to be quite exceptional, though recorded by Lilford. *B.W.T.*

**Voice.**—Call of male (very distinctive) is loud, musical, whistling "*whee*-ōō" uttered with open bill, with variant "wheu" and when angry "whee*ye*-ĭrrr." Also a very peculiar cheeping note when frightened (Millais). Call of female a purring growl; alarm note somewhat similar, but quite distinct and harsher (Millais). The pair may call in unison, giving effect of a single note. A rare, but very striking note of female (not alarm) is a piercing shriek uttered with head and neck on water (H. W. Robinson). *B.W.T.*

**Display and Posturing.**—Display is feebly developed. Usually several males crowd round female, raising head-feathers, stretching out neck close to water and erecting long scapulars; carpal region of wing also depressed downwards so as to elevate primaries; display accompanied by constant and loud whistling (Millais). Many are paired by end of Mar., moving to breeding-grounds together (Millais), and pairs are very united, drakes not having the promiscuous tendencies of many species (O. Heinroth). *F.C.R.J. & B.W.T.*

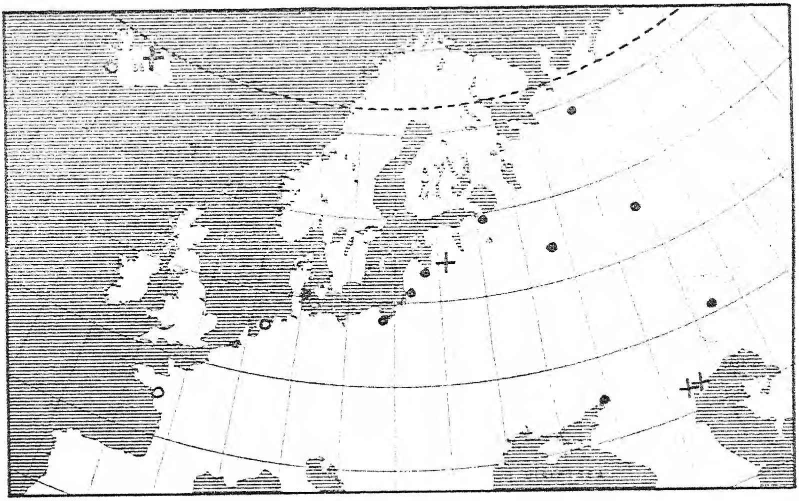
**Breeding.**—Breeds on moorlands, often near streamlets, on islands in lochs, rough pastureland, and bracken-covered slopes. *Nest.*—On ground among heather, bracken or wiry grass, made by duck, lined grass, bracken, or heather stems and down, which is dark with indistinct light centres, tips lighter, but not white as in Garganey. Feathers usually rather small, white, or white with grey in middle (see Plate 85A). *Eggs.*—Usually 7–8, but 6–10 recorded, cream colour or buff, smooth and fine-grained, ovate or elliptical. Average of 100 British eggs, 53·93×38·25. Max.: 59·9×38 and 52·6×42·1. Min.: 49·2×37·9 and 50·8×34·7 mm. E. Rey gives average weight, 3·308 grams (3·87 to 2·6 gr.). Closely resemble those of Gadwall, but downs distinctive. *Breeding-season.*—From early May onward, but usually in second half of month in Scotland. *Incubation.*—By duck alone, begins with last egg: drake often on watch not far off. Period, usually 24–25 days in confinement, but 28 also recorded. *Fledging.*—Young led to water by duck and tended by her, but drake usually rejoins family. Period 6 weeks (O. Heinroth). Single-brooded. *F.C.R.J.*

**Food.**—British records and those from other breeding-grounds almost entirely of vegetable matter; only exceptions Mollusca (small *Cardium*) in Scotland and insects (Diptera) in Iceland. Vegetable matter includes grasses of various species, also *Equisetum*, *Glyceria fluitans*, *Ruppia*, *Ranunculus*, *Apium nodiflorum*, *Potamogeton*, *Enteromorpha*, *Polygonum*, *Trifolium*, but favourite food in autumn is *Zostera marina*. Seeds of *Carex* and *Hippuris* also taken, moss (*Hypnum*) and blackberries as well as grain have been recorded. P. Madon in one bird (France) found 23 Coleoptera of 10 species (*Carabus*, *Nebria*, *Harpalus*, *Hister*, *Dermestes*, *Agriotes*, *Onthophagus*, *Sitona*), 1 Hemipteron and 1 spider. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident, passage-migrant and winter-visitor. As breeding bird has spread greatly since original colonization about 100 years ago in Sutherland and still continues to expand its breeding range, but some cases of breeding in England probably due to effects of introductions. As winter-visitor common all coasts and many inland waters but considered to have decreased in recent years. Now widely distributed as breeding bird in mainland *Scotland* north of Firths of Clyde and Forth except Stirling, W. Inverness, Aberdeen, and Banff; also breeds in small numbers Midlothian, Selkirk, Roxburgh, Wigtown, Kirkcudbright, Coll, S., and perhaps also N., Uist (O. Hebrides), and Shetlands and Orkneys. In *England* breeds Cumberland and has bred Northumberland (1913, 1915, 1921, 1925, 1926, 1931 and probably since), Yorks (1897, 1901), Lincs (1898), ? Norfolk (1919), Essex (1938), Kent (1932), and also Merioneth (1898, 1934, and probably other years). In *Ireland* a pair bred Armagh in 1933. *H.F.W.*

**Migrations.**—*British Isles.*—Recoveries of ringed birds show that British bred Wigeon are to some extent resident, though some move south in autumn within the Brit. Is., while others migrate to Ireland, N. France, and Holland. Passage-migrants and winter-visitors from Continent (ringed in N., W., central, S. and S.E. Russia, Latvia, Denmark, and Iceland) arrive N. and E.

coasts from end Aug. to end Nov. (eraly dates, July 28, 1935, Oxon ; Aug. 1, 1928, Norfolk ; 6, Suffolk ; 17, 1925, Fair Is. ; 20, 1925, O. Hebrides) and pass to all parts Great Britain and Ireland. Icelandic birds appear to go particularly to N. Scotland and Ireland. Passage-migrants continue to N. France during winter. Return passage mid-March to end April, with stragglers most years to mid-May and occasionally June. A few winter-visitors ringed in Britain have been recovered in winter-quarters or on passage in autumn in subsequent years in the same or different parts of Brit. Is. and in Lithuania, Danzig, N. Frisian Is., Holland, N. France and Italy. British-bred birds (one hand-reared) have been recovered as abmigrants (see note, p. 235) in N. and central Russia and Denmark. One nestling ringed Kinross June was recovered Iceland the following January. *N.F.T.*



Map to show migrations of Wigeon.

(Compiled from records of ringed birds by Miss E. P. Leach.)

Solid dots show recovery positions in breeding-season of birds ringed in winter in Great Britain. Crosses show localities where birds afterwards reported in winter in the British Islands were ringed in the breeding-season. Open circles show recovery positions in autumn and winter of birds ringed in Great Britain as young.

**Distribution Abroad.**—N. Palæarctic region. Breeds in Europe north to Iceland, Færoes ?, Norway to 70°, N. Finland, N. Russia (Murman coast, Waigatz). Also occurs Siberia to Kamtschatka and Commander Is. In south to Holland (rare), Germany, Denmark (rare), E. Prussia, N. Poland, and Russia (Kiev, Voronezh, and Astrakhan Govts., Transcaucasia) : in Asia reported breeding Syria, and Turkestan : from Kirghiz Steppes, Altai, Semipalatinsk to N.W. Mongolia and S. Ussuria. Has bred in Greenland. Migrates through Mediterranean region and N. Africa to tropical Africa (Nigeria to Kenya Colony) : in Asia to Arabia, Iraq, Persia, Baluchistan, India, China, Burma, Sunda and Marshall Is., Japan. In N. America on Pacific and S. Atlantic coasts and Mississippi valley. Casual Jan Mayen, Spitsbergen, Bear Is., Novaya Zemlya, Waigatz, Azores, Madeira, Canaries, and Pribilof Is. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head and crown cream or cinnamon-buff (paler when worn), feathers of hinder-crown with black bar at tip ; nape chestnut, tips of feathers with narrow bar of black glossed green ; mantle and upper scapulars finely vermiculated dark mouse-grey and white, long scapulars with mouse-grey shaft-streaks, lower scapulars plain mouse-grey ; back and rump mouse-grey, vermiculated white ; sides of rump white ; central upper tail-coverts pale mouse-grey edged white or light buff, some with broad white tips vermiculated mouse-grey, lower ones blackish-grey or black edged light buff, remainder black ; (*sides of head*) lores, cheeks and sides of neck chestnut, feathers mostly tipped black ; a patch behind eye to nape with broad black tips glossed metallic-green ; (*under-parts*) chin and throat black ; (black tips and bars of head and neck become worn off) ; upper-breast pink-vinaceous, feathers narrowly tipped white ; sides of body and flanks strongly vermiculated dark mouse-grey and white, many feathers clouded towards base with pink-vinaceous ; centre of breast, belly and vent white, patch behind tibia finely vermiculated dusky ; under tail-coverts black ; axillaries and under wing-coverts freckled and clouded dusky-grey ; *tail-feathers* mouse-grey narrowly edged white or buff, central pair deep (sometimes blackish) mouse-grey without white edges ; *primaries* sepia, paler on inner webs ; *secondaries* sepia with small white tips, all save two outermost with proximal half of outer web metallic-green, distal half black (forming *speculum*), that next innermost with outer web white narrowly margined black, *innermost secondaries* mouse-grey, outer webs black edged white and short ones uniform ; *primary-coverts* and *bastard-wing* as primaries ; *greater coverts* with broad black tips, outer webs white and inner mouse-grey, innermost feathers mouse-grey faintly edged white ; *median coverts* white, inner ones, *lesser coverts* and bend of wing mouse-grey edged light buff or white. This plumage is acquired by a moult of body-feathers, innermost secondaries and central pair of tail-feathers Aug. to Jan.

ADULT MALE. ECLIPSE.—The body-feathers are first moulted followed by wings and tail June to Sept. Resembles adult *female*, but distinguished by white *wing-coverts*, and plumage richer cinnamon-brown. *Head* and *neck* as adult female, but fore-part of crown usually with larger black-brown spots and bars ; hinder-crown and nape more heavily spotted and barred black glossed green ; *chin, throat, sides of neck* and *fore-neck* rich cinnamon-brown narrowly streaked black, sometimes with a green gloss ; (*upper-parts*) feathers of upper-mantle sepia or black-brown with broad cinnamon-brown, buff-brown, olive-grey or pink-buff fringes, more or less strongly barred pink-buff or pink-cinnamon (more uniform type has bars less pronounced, and more or less concealed), feathers of centre of mantle usually with barring less pronounced and light edges broader ;[1] scapulars black-brown with broad barrings, markings and edgings of rich cinnamon-brown, some with white tips or faint white wavy barrings, lowest scapulars as in winter ; (sometimes scapulars intermixed with dark ash-brown feathers with one or both webs coarsely vermiculated whitish, some shading to cinnamon-brown at tip) ; feathers of back and rump dark ash-grey with faint white or buff tips (back sometimes finely vermiculated white) ; upper tail-coverts much as in adult female but in some more or less without barring, in others irregularly barred whitish ; (*under-parts*) upper-breast rich cinnamon-brown, feathers sometimes tipped buff-brown, mostly with sepia or black-brown partially concealed spots or bars ; sides of body and flanks rich cinnamon-brown (sometimes some flank-feathers whitish with one or both webs coarsely vermiculated dark ash-brown, some suffused cinnamon-brown) ; rest of under-parts as in adult female ; central pair of *tail-feathers* mouse-grey or sepia only slightly longer than rest, not finely tapering to a point as in winter ; *wing* as winter but innermost secondaries with rounder, less pointed tips.

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[1] These variations form three types (which intergrade) with mantle : (*a*) barred ; (*b*) less barred ; (*c*) vermiculated.

ADULT FEMALE. ECLIPSE.—Whole *head* and *neck* pink-buff thickly spotted and barred black-brown (glossed dull green on crown); chin and part of throat sometimes uniform buff; (*upper-parts*) mantle brown, feathers edged whitish or buff, some feathers of upper-mantle barred pink-buff; scapulars black-brown broadly edged and sometimes barred pink-buff, lowest scapulars dark sepia, tipped white (mantle and scapulars usually without barring); back and rump brown (sides of rump pink-cinnamon), feathers edged white; upper tail-coverts sepia fringed buff or whitish and usually with buff marks; (*under-parts*) upper-breast, sides of body and flanks brown much concealed by pinkish-white or buff fringes; centre of breast, belly and vent white, latter shaded dusky-grey; under tail-coverts white with dark sepia markings, long feathers dark brown edged and broadly barred white or buff; axillaries much as male; under wing-coverts brown marked paler; *tail-feathers* as male but sometimes with buff marks, central pair deep mouse-grey usually with an obsolete buff bar and edged white; *primaries* as male; four outer *secondaries* deep mouse-grey tipped white, rest with outer webs blackish tipped white and usually with a green gloss (green *speculum* rarely almost as brilliant as in male), one next speculum with outer web white as in male; *greater coverts* brown with outer webs edged greyish-white and with narrow black-brown tips, in some both webs tipped black and with a whitish subterminal bar, in some both webs broadly tipped white (forming double wing-bar with white tips of secondaries); *median coverts* brown with broad white edges, in some suffused or with bar of pink-buff; *lesser coverts* dark ash-brown faintly edged white (soon lost by abrasion). This plumage is acquired by complete moult July to Sept.

ADULT FEMALE. WINTER AND SUMMER.—The body-feathers, sometimes some tail-feathers, some innermost secondaries and coverts, occasionally an odd median covert are moulted Oct. to April. Some acquire most of breeding plumage by Dec. or Jan., tail-feathers are usually moulted Jan. or Feb., innermost secondaries not till April or May. There are two types of plumage, one *plain*, one *barred*, these types again fall into two types, a *greyish* and a *reddish* one. In barred type (*upper-parts*) mantle brown with strong and numerous transverse pink-buff bars, feathers narrowly edged same or whitish, in the *grey type* with deep olive-grey edges; scapulars brown-black with pink-buff edges (not broad as in eclipse) and bars; new feathers of rump and upper tail-coverts black-brown with buff or white bars and edged whitish or pink-cinnamon; (*under-parts*) new feathers of breast in some with subterminal black-brown bars; new *tail-feathers* as eclipse; new innermost *secondaries* black-brown with irregular longitudinal light pink-cinnamon markings (variegated with black) and narrowly edged same. *Plain type* has feathers of *upper-parts* with fewer and usually incomplete bars. *Nest-down* is acquired in spring.

NESTLING.—Upper-parts similar to Mallard but sepia or black-brown without olivaceous tinge, down-filaments cinnamon-buff instead of yellowish, wing-bar, and patches (often ill-defined) on either side of centre of back and rump cinnamon-buff; eye-stripe, cheeks and sides of neck suffused pale cinnamon-brown; line through eye absent but in some a darker streak extending from lores to below eye; chin and throat cream or cinnamon-buff; fore-neck suffused cinnamon-buff or pale cinnamon-brown; remaining under-parts cream-buff.

JUVENILE. MALE.—In general appearance resembling adult female but distinguished at once by median wing-coverts (see below). (*Upper-parts*) head and neck as adult female; mantle usually darker, with narrower edges and bars not so pronounced as in adult winter-summer female and sometimes absent;[1] lowest scapulars with narrower white tips often freckled dusky; *under-parts* as adult female but sometimes belly and vent barred and spotted dusky; *tail-*

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[1] As in adult ♀ there are two types, one barred and one with mantle more uniform; a rarer variety has feathers of centre of upper-mantle dark ash-grey with olive-grey edges and indefinite whitish frecklings and vermiculations.

*feathers* sepia narrowly edged white or light buff ; *wing* as adult female, in some outer *secondaries* with outer webs bordered black, in some green *speculum* absent, outer webs of middle secondaries being blackish in some lights with a greenish gloss; innermost secondaries olive-brown, outer webs tinged dull greenish-black and with a buff or white edge ; *greater coverts* ash-brown or with outer web white and inner greyish-white, with dull black tips and often a subterminal buff or white bar, or ash-brown with broad white tips ; *median coverts* vary greatly, in some ash-brown clouded buff and tipped drab-grey or greyish-white and with dark shafts, some white irregularly marked ash-brown (very distinct from those of adult female which have broad pure white edges) ; *lesser coverts* and coverts of bend of wing dark ash-brown, latter sometimes narrowly edged white.[1] FEMALE.—As male but (*upper-parts*) mantle and scapulars occasionally with indistinct bar ; lowest scapulars as adult female but white tips narrower and occasionally speckled dusky (usually broader and whiter than in male) ; *wing* as adult female but *speculum* usually duller black, in some sepia, often more or less mottled or clouded white, feather next speculum usually with less white on outer web than in adult female ; *greater coverts* ash-brown with whitish tips (in some speckled black or with a more or less blackish tip) ; *median* coverts olive-brown with buff-white, drab-grey or buff tips, in some clouded or irregularly barred buff, in some almost as broadly tipped white as in adult female ; *lesser coverts* as juvenile male. In some breast, belly and vent are more or less spotted dusky-brown.

FIRST WINTER. MALE.[2]—Most body-feathers, sometimes all tail-feathers, sometimes none, sometimes one or two central pairs only, sometimes some innermost secondaries, occasionally an odd median covert are moulted Oct. to Feb., March or April, often feathers of back and rump and other juvenile body-feathers are retained. As adult winter and only to be distinguished by retained juvenile body-feathers, tail-feathers and wing-coverts.

FIRST WINTER. FEMALE.—As adult eclipse and only to be distinguished by retained juvenile body-feathers, tail-feathers and juvenile median and lesser coverts. Most body-feathers, not all those of back and rump, some tail-feathers (usually central pair only), occasionally but not usually innermost secondaries are moulted Oct. to March. Some Feb. birds examined had not commenced to moult the juvenile plumage. In such cases probably very little 1st winter plumage is acquired, the birds moulting straight into first summer plumage. FIRST SUMMER.—In advanced birds a considerable amount of breeding plumage is acquired in March, April and May ; in some all tail-feathers are renewed, others retain some juvenile ones. Moult of tail takes place winter and spring, central pair is nearly always renewed. Innermost secondaries irregularly marked buff are acquired in some. In less forward birds very little breeding plumage is acquired and new feathers contrast strongly with worn and faded ones of first winter and in some cases juvenile plumage.

FIRST ECLIPSE. MALE.—As adult eclipse and only to be distinguished when juvenile wing-coverts have not all been shed. Moult as in adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 254–270 mm., tail 95–108, tarsus 35–40, bill from feathers 33–36 (12 measured). ♀ wing 236–255, bill 31–34. Primaries : 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd equal or 2–4 mm. shorter, 4th 11–14 shorter, 5th 25–29 shorter, 6th 40–45 shorter ; 2nd emarginated inner and 3rd outer webs. Innermost secondaries

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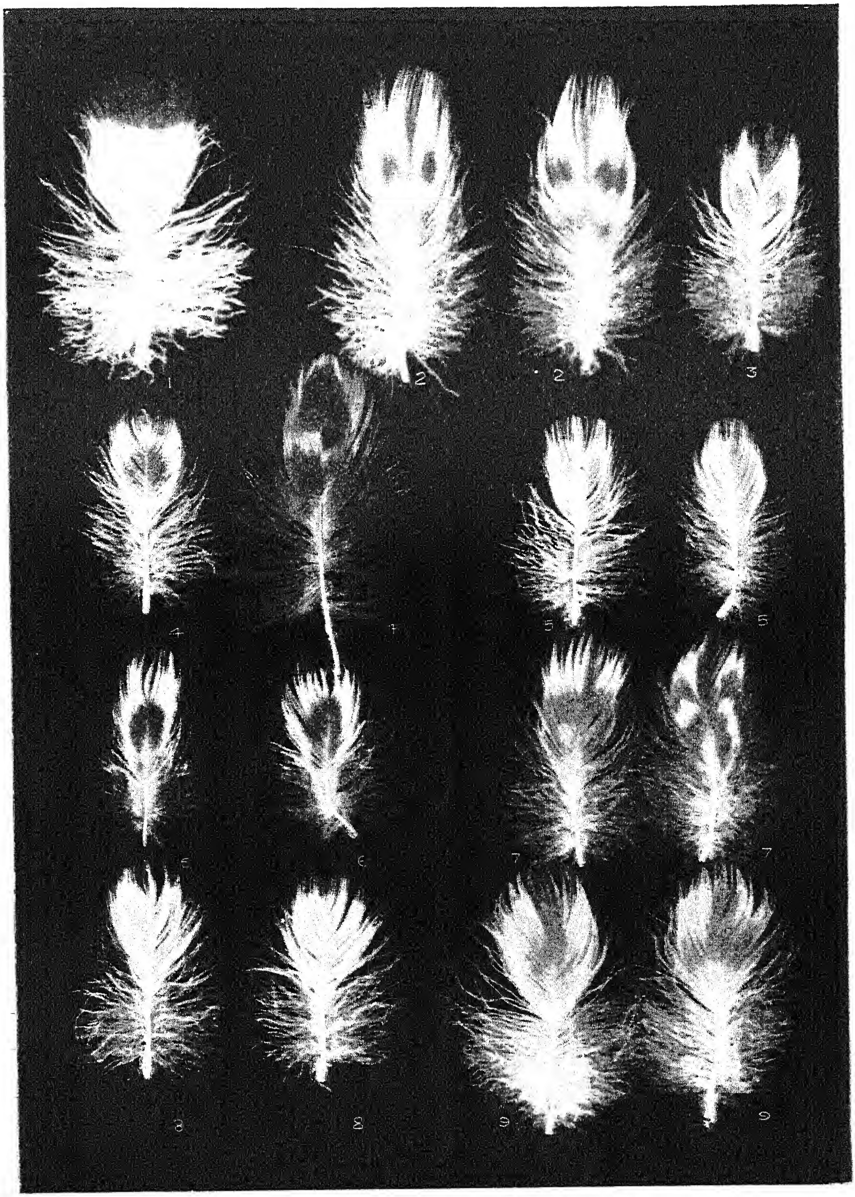
[1] The type with little barring on upper-parts, with greater coverts ash-brown tipped white and median coverts ash-brown suffused buff are difficult to distinguish from some types of juvenile females with similar wing-coverts, but vermiculated grey and white feathers which are soon acquired at side of rump in male afford infallible guide.

[2] In assumption of first winter plumage whitish feathers coarsely vermiculated grey-brown and more or less suffused pale pink-cinnamon may be acquired, and are subsequently shed. [*A.C.M.*]

PLATE 85A



FEATHERS FROM NESTS OF DUCKS (*Nat. size*).
Sheld-Duck. 2, 2. Mallard. 3. Gadwall. 4, 4. Shoveler. 5, 5. Teal. 6, 6. Garganey. 7, 7. Pintail.
8, 8. Wigeon. 9, 9. Common Pochard.

moderately long and pointed and between 6th and 7th or 7th and 8th primaries; in eclipse less pointed at tip. Scapulars elongated and tapering to an obtuse point; in eclipse with rounded, almost square, tips. Tail short, rounded, 14 feathers, central pair tapering sharply to a point and projecting beyond rest; in eclipse less pointed and only slightly projecting. Bill small, rather narrow, shorter than head, edges parallel nearly to tip where they gradually converge to form a rounded tip, lamellæ of upper mandible almost concealed.

SOFT PARTS.—Bill (ad. ♂) bright slate-blue with black tip (♀ and juv.) duller; legs and feet variable bluish-grey, pale lead tinged olive, to yellowish-brown, webs dusky; iris brown. [*A.C.M.* revised by *H.F.W.*]

**Characters and allied species.**—No subspecies. For differences of American Wigeon see under that species. From other British ducks adult male distinguished by dark mouse-grey and white vermiculated upper-parts, black and green speculum and white wing-coverts, adult and juvenile females have speculum blackish or partly metallic-green, only one inner secondary with outer web white and greater coverts with hardly any black (distinction from Gadwall). Juvenile male has speculum blackish usually with a little green, median coverts with no chestnut, greater coverts with hardly any black (distinction from juvenile Gadwall). [*A.C.M.*]

*PLATES 82, 85, and 91.*

## 324. THE AMERICAN WIGEON—Anas americana Gm.

ANAS AMERICANA Gmelin, Syst. Nat., i, ii, p. 526 (1789—N. America).
*Mareca americana* (Gmelin), Yarrell, iv, p. 403; Saunders, p. 439.
*Anas americana* Gm., Pract. Handb., ii, p. 296.

**Habitat.**—Much as Wigeon, but generally less marine in habits, resorting outside breeding-season largely to rice-fields, marshes, and flooded lands, though also to tidal flats, estuaries, etc. *B.W.T.*

**Field-characters and General Habits.**—Drake easily distinguished from Wigeon by *grey head and white crown* and darker flanks contrasting more strongly with white patch in front of black under tail-coverts; patch on side of head glossy green, visible only in good light (R. T. Peterson). At close-quarters sides of head finely speckled and streaked, flanks brown instead of grey, otherwise characters as Wigeon, including white fore-wing. Duck more difficult to distinguish, but head and neck look paler, more grey, instead of rufous, and under-parts show rather more white than in female *A. penelope* (C. E. Alford, Peterson); diagnostic point is white, instead of dusky, axillaries, but this can rarely be seen in field. Moults, etc., as in Wigeon and eclipse plumages of the two species are very similar except for greyer head of present species. Total length *c.* 18 ins.; body *c.* 12 ins.

Except for greater attachment to fresh waters, habits, flight and general behaviour are very much like European Wigeon's. Will attend on diving Coots and Canvasbacks to exact a share of the water-weeds they pull up (*cf.* Wigeon and Brent Goose). Where much persecuted is extremely shy, sheltering during day amid reeds and herbage and feeding only at dawn and dusk. When alarmed by gunshot makes straight for open sea (C. E. Alford). *B.W.T.*

**Voice.**—Notes of both sexes are like those of Wigeon, but they are more silent birds and whistle of male is "not nearly so wild and strong" (Millais).

An alternative and louder cry compared by E. H. Eaton to syllables "kaow, kaow" is possibly the same as a rough croaking quack, a rapidly repeated "kah-kah-kah," almost chattering, recorded as an occasional note by A. Brooks. A low, short chattering, somewhat resembling Pintail's, but greatly reduced in volume (J. H. Bowles) is also recorded. *B.W.T.*

**Display and Posturing.**—Courtship is same as European Wigeon's (Millais). Cocking up of primaries, at angle of *c.* 45° to as much as 60–70°, is performed by both sexes (Phillips, fig'd. pl. 30). A swift and erratic courtship-flight on breeding-ground initiated by two males approaching a female bowing and whistling and following her as she rose in the air, is described by A. Wetmore; "the males dart ahead of the female setting and decurving their wings and throwing their heads up, exhibiting their striking markings to the best advantage." "Injury-feigning" recorded by E. W. Nelson. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds freely on islands in lakes in N. Dakota, where there is no tree-growth: but also on high ground, sheltered by conifers in Alaska. *Nest.*—May be a considerable distance from water, in hollow on ground, sheltered by rank grass, weeds, rose-bushes or trees, made of dry grasses and weeds with a plentiful lining of down and feathers. A. C. Bent describes down as light drab "with whitish centres and conspicuous white tips," while that of the Gadwall is said to have "light tips." Possibly some confusion between the nests of the two species, admittedly not easy to distinguish. *Eggs.*—Usually 9–11, but 6–13 recorded, not distinguishable from those of European Wigeon. Average of 81 eggs (Bent), 53·9×38·3. Max.: 60×40 and 58·2×40·2. Min.: 50·5×38 and 54×36 mm. *Breeding-season.*—June. *Incubation.*—By duck alone. Period (in confinement) 24–25 days (A. F. Moody and J. C. Laidlay). *Fledging.*—Young tended by duck. Period about 6–7 weeks. Single-brooded. *F.C.R.J.*

**Food.**—Chiefly vegetable matter: 93·23% according to D. C. Mabbott: pond-weed 48·8%, grasses 13·9, algæ 7·7, wild celery 5·7, water-lily, water-milfoil, *Polygonum*, duckweed, and other plants and seeds. Animal matter, 6·77%; Mollusca (snails), 6·25%; insects, 0·42%. Rice and shells of *Truncatella* also recorded. (See A. C. Bent, *Life Histories of N. American Wild Fowl, Anseres* (pt.), p. 94.) *F.C.R.J.*

**Distribution.**—*Great Britain.*—Very rare vagrant. Male identified, and female probably, at London Market, winter 1837–8. Young male found at Leeds game-stall, Feb., 1895 (Saunders, p. 439). Adult male shot Benbecula (O. Hebrides), Jan. 3, 1907 (*Bull. B.O.C.*, xix, p. 57). Adult male seen Anglesey, June, 1910 (*Brit. B.*, iv, pp. 87, 256). Adult male seen Bardowie Loch (Stirling), Dec. 14, 1919 (*op. c.*, xiii, p. 244). Adult male seen R. Eden (Fife), Nov. 24, 1919 (*Scot. Nat.*, 1920, p. 13). A pair shot N. Uist (O. Hebrides) Feb. 10, 1931 (*Brit. B.*, xxiv, p. 369). Adult male identified Fife, Nov. 29, 1938 (J. Berry). Other occurrences (unauthenticated) recorded, and some of above may be due to introduction. *H.F.W.*

**Distribution Abroad.**—Nearctic region. Breeds from N.W. Alaska, N. British Columbia, Washington and Oregon east to Hudson Bay and Manitoba: south to N. Indiana, N. Nebraska, N. Colorado, N. Utah, N.W. Nevada, and N.E. California (*A.O.U. Check-List*). Breeding in Iceland not substantiated. Winters south to Panama and Pacific coast of central America. Casual in

Bermuda, W. Indies, New Brunswick, Greenland, Aleutian, Commander and Hawaiian Is., Japan and Azores. (European records (France, Holland) may be due to escapes.) *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) resembling Wigeon but fore-head and crown white or pale buff ; nape buff, feathers barred black ; mantle and scapulars as in Wigeon but vermiculated pink-vinaceous and dark mouse-grey ; back and rump deep mouse-grey with much finer vermiculations than in Wigeon ; (*sides of head* and *under-parts*) patch of metallic-green (in some lights reddish-bronze) on side of head, surrounding eye and extending to nape, feathers with buff bars and tips, bars in some more or less concealed except where bordering nape (buff tips are more or less lost by abrasion) ; lores, cheeks, sides of neck, chin and throat light buff heavily spotted and streaked black-brown ; sides of body and flanks pink-vinaceous more or less vermiculated dark mouse-grey ; axillaries and median under wing-coverts white, coverts at edge and bend of wing pale dusky-brown freckled white ; remaining under-parts as in Wigeon ; *tail* as in Wigeon but central pair often more acutely tapering ; *wing* as in Wigeon but *speculum* with less green and larger amount of black, green confined to narrow proximal band, outer *secondaries* with outer webs almost entirely black, secondary next innermost with outer web often clouded grey ; *greater coverts* with broader black tips. Moult presumably as in Wigeon, but very little material examined.

ADULT MALE. ECLIPSE.—(Not examined.) Described by J. C. Phillips as resembling female, but *head*, *sides of breast* and *flanks* much richer in tone of colour and inclining to chestnut ; *mantle* and *scapulars* somewhat richer and may have a few vermiculated feathers ; white *wing-coverts* distinguish it from female. Much greyer on head than Wigeon in eclipse, but otherwise not easy to distinguish.

ADULT FEMALE. WINTER AND SUMMER.—Similar to Wigeon but *crown* and *nape* cream or light buff instead of pink-buff or pink-cinnamon ; *cheeks*, *sides of neck*, *chin*, *throat* and *fore-neck* cream or light buff, instead of pink-buff or pink-cinnamon heavily spotted dusky-brown ; *axillaries* and *under wing-coverts* white as in male ; green when present on *speculum* less extensive, rest of speculum black, *secondary* next innermost with outer web clouded palest grey ; *greater coverts* with outer webs white, inner webs ash-brown and with broad velvet-black tips (in Wigeon ash-brown or sepia, outer webs edged greyish-white and with narrow black-brown tips) ; rest of *wing-coverts* including innermost greater as in Wigeon. Moult apparently as in Wigeon.

NESTLING.—Apparently not distinguishable from that of Wigeon.

JUVENILE. MALE.—Similar to that of Wigeon but *fore-head* and fore-part of *crown* cream or light buff heavily streaked sepia ; hinder-crown sepia, feathers with white edges and V-shaped bars (in Wigeon pink-buff or pink-cinnamon, feathers irregularly barred and marked black) ; *cheeks*, *sides of neck*, *chin*, *throat* and *fore-neck* light buff or cream (in Wigeon pink-buff or pink-cinnamon) and similarly spotted black-brown ; *axillaries* and *under wing-coverts* (white) and *speculum* as in adult male American Wigeon but in some green of speculum as extensive as in juv. Wigeon ; *secondary* next innermost with outer web clouded palest grey but not so extensively as in adult male American Wigeon ; greater coverts as adult male. FEMALE.—Similar to female Wigeon but head, neck, axillaries, under wing-coverts and greater coverts as juv. male, and distinguished from juv. female Wigeon by same characters as given under juv. male.

FIRST WINTER AND SUMMER. MALE.—As adult winter but distinguished by juv. wing-coverts. FEMALE.—As adult female but distinguished by juv. median and lesser coverts having narrow grey-buff, not broad white, edges. Moult apparently as in Wigeon.

MEASUREMENTS AND STRUCTURE and SOFT PARTS.—As in Wigeon.

[*A.C.M.* revised by *H.F.W.*]

*PLATES 80, 82, 85a, and 86.*

## 325. THE PINTAIL—Anas acuta acuta L.

ANAS ACUTA Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—"Habitat in Europæ maritimis." Restricted typical locality: Sweden).
*Dafila acuta* (Linnæus), Yarrell, iv, p. 380; Saunders, p. 429; Hand-List (1912), p. 138.
*Anas acuta acuta* L., Pract. Handb., ii, p. 298.

**Habitat.**—Typical haunts in breeding-season are very much as Wigeon's (*q.v.*), from tundra pools to lochs in more cultivated country, but generally prefers those with dry rather than marshy surroundings; also fresh-water and brackish lagoons in the south. Outside breeding-season primarily maritime in Europe, frequenting sea-coasts and estuaries; also frequents larger decoy-pools, lakes, etc. near sea fairly freely, but rarer on fresh waters far inland. In India, however, is more a fresh-water bird. *B.W.T.*

**Field-characters and General Habits.**—Drake is unmistakable. At long range a mainly grey bird with *dark head and neck and white band extending down side of latter to join white breast* and light (creamy-yellow) patch in front of black under tail-coverts. At closer quarters *long pointed tail*, often raised at an angle, though lowered if uneasy, adds to distinctive appearance, and chocolate colour of head and neck, vermiculated pattern of back and flanks, and conspicuously elongated, buff-edged black scapulars can be distinguished. Belly white. General plumage of female is much like Mallard duck, but combination of more delicate form, slender neck, pointed tail (but not elongated like male's) and grey, not dark olive, bill readily separate her at reasonable range; confusion is perhaps more likely with Gadwall duck, but absence of white on wing and orange on bill, as well as other points mentioned, should prevent this. Absence of prominent speculum is further distinction from Mallard, if this region of wing is visible, and large, bold crescentic markings on flanks are rather distinctive. Bill blue-grey in drake, legs grey. Speculum of male is bronzy-green, shading to black behind with warm buff bar in front; that of female is obscure and brownish, the bar in front less pronounced. In both sexes it is margined by white behind, and this forms *light hinder border to wing*, which is noticeable in flight and a good character of dull-winged duck, though long slender neck, pointed tail, and narrow pointed wings are no less distinctive. Full plumage of drake is complete from about Oct.-Nov. or later to about end of June and eclipse complete from about mid-July to early Sept. (Millais). Eclipse and juvenile plumage resemble the duck's, but have upper-parts darker and more uniform; young drakes soon begin to show traces of adult feathering on the back and full plumage may be acquired as early as Dec., though in others it is not complete till Feb. or later (Millais). Total length *c.* 22 ins.; body *c.* 14 ins. (to facilitate comparison with other species both measurements are taken without the longer central tail-feathers which may extend as much as 4 ins. beyond the rest in adult drakes).

Naturally shy and suspicious. Flight very rapid, with quick wing-beats, which produce a low hissing sound; wing action more like Wigeon than Mallard. Walks with ease and grace. Rarely numerous on inland waters in Britain, generally singly or in pairs or quite small parties, though in India "always found in flocks, seldom in number less than twenty birds, and often numbering several hundreds" (H. Whistler). On the sea large numbers often occur, and flocks of as many as eleven hundred are recorded (Millais), but as a rule they tend to adopt a loose formation and to split up into parties instead of forming compact flocks like Wigeon. Associates freely with other species. Feeding-habits on the coast are much like Wigeon's. When "up-ending" the tail is depressed, not carried in line with body. Perhaps more of a nocturnal feeder, even when undisturbed, than most other species, but will feed by day at times. In inland localities will feed on fields, marshes, etc., and on small waters which are avoided by day. Diving does not seem to be recorded except when wounded or incapable of flight during moult, or in captivity. *B.W.T.*

**Voice.**—Note of male, rarely heard except in display, is a low double whistle described as like Teal's, but lower in pitch and as a musical "quuck, quuck," which has been likened to notes of a violin (C. Oldham). O. Heinroth distinguishes between ordinary form of note, rendered "krück," and the one used in display, which is said to be much softer. Drake appears to have no other note except one "something like the cheeping-peevish cry made by the Wigeon when very frightened or wounded" (Millais). Female sometimes uses a low "quack" and also makes a noise something like growling croak of female Wigeon (Millais, Heinroth); the latter note is perhaps the same as a rolling note mentioned by A. C. Bent (in American race) and thought to be common to both sexes. Incitement note of female to male a soft "rārrĕrrĕrr" (Heinroth). *B.W.T.*

**Display and Posturing.**—Display is essentially like Mallard's; tail cocked up in attitude 4 (fig'd. Millais, p. 96), but attitude 5 seldom assumed except after coition (H. Wormald). A. Morley has observed jerky straightening of neck while bill is kept horizontal (*cf.* Shoveler), accompanied by display note, and describes males first swimming away from one another, then turning and rushing at one another, just grazing past so as to avoid actual collision. T. A. Coward describes them as swimming in the intervals between the erect posturing with necks stiff, bills depressed, and tails elevated. Aerial pursuits of duck by several males are regular and well described by E. W. Nelson in American race: on May 17 chase was witnessed, started by one male, others joining in till there were six in all. Only original pursuer seemed able to catch up with female, and this with difficulty, but whenever he succeeded he passed beneath her, keeping so close that their wings clattered together with a loud noise like that of a watchman's rattle; in course of half an hour pursuers dropped off one by one till only a single drake (believed the original one) was left, when pair settled together. F. Harper describes similar flights in which female at times made a kind of "fluttering pause," perhaps "when the male of her choice came near her," and Phillips suggests that the rattling sound may be due to braking during this action and not to actual wing-contact. Nelson also describes habit in spring of plunging from great height at angle of *c.* 45° with wings stiffly spread and slightly decurved till a few yards from ground and then gliding 1–300 yds. without wing-stroke. "Injury-feigning" recorded in American race. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds socially on islands in lakes, but also in neighbourhood of lagoons, among marram grass on dunes and on heather-covered shores of lakes. *Nest.*—Sometimes mere hollow on fairly open ground, at other times among heather or rank grass or in midst of large clump of rush: not necessarily near water and more exposed than most ducks' nests. Down not easy to identify; sprays rather larger than in Shoveler, clove-brown with light centres. For feathers see Plate 85A. *Eggs.*—Usually 7–9, but 6–12 on record: shape ovate, occasionally elongated: colour variable: yellowish-green and yellowish-cream are main types: bluish eggs also occur. Average of 100 British eggs, 54·2×37·44. Max.: 61·9×38·7 and 58·6×40·8. Min.: 51·2×37·4 and 54·4×33·6 mm. H. Goebel gives average weight as 3·25 grams (3·6 to 2·7 gr.). *Breeding-season.*—From beginning of May onward in Scotland. *Incubation.*—By duck alone: drake remaining in neighbourhood: begins on completion of clutch. Period almost exactly 23 days in confinement. *Fledging.*—Young tended by duck, but usually joined by drake. Period variably estimated at 5 to 7 weeks. Single-brooded. *F.C.R.J.*

**Food.**—Apparently chiefly vegetable matter; especially seeds and portions of plants of *Cochlearia*, *Potamogeton*, *Carex*, *Polygonum*, *Rumex* and *Pilularia*, also *Glyceria fluitans*, and in autumn *Zostera marina* and various algæ. R. Newstead records acorns and Naumann occasionally corn (oats) from stubble. Animal food includes insects, chiefly Coleoptera (*Dytiscus*, etc.) and larvæ of Diptera (*Chironomus plumosus*, *Ceratopogon*); Mollusca (*Rissoa ulvæ*, *Planorbis*, etc.), Annelida (earthworms), Amphibia (young and spawn of frogs); small fish (trout) exceptionally. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident, passage-migrant and winter-visitor. As breeding-bird is spreading slightly, but many cases of breeding are sporadic and some are certainly due to introduction. In *Scotland* breeds regularly Kinross (L. Leven since 1898 and probably before), Fife (first 1920), Aberdeen, Orkneys (first about 1907) and Shetlands (first 1905), and Morayshire (first before 1914). Has also bred Caithness (1931), Sutherland (? 1882, 1936), Ross (1915), Inverness (? 1869, 1935), Perth (1924), Angus (1936), ? Midlothian (1912), Selkirk (1901), Skye (1889) and S. Uist (O. Hebrides) (1902 and probably other years). In *England* has bred Cumberland (1917), ? Westmorland (1932), Yorks (1932, 1938), Norfolk (1929), Sussex-Kent border (1936 and probably for several years previously in Sussex or Kent), Cornwall (1938, B. H. Ryves). In *Ireland* said to have bred many years ago Queen's co., proved to breed there 1932, bred Roscommon (1917 and more recently), has bred Armagh since 1923, and more recently in Antrim and Down. As winter-visitor regular, but local on all coasts, usually in small, but in few parts in considerable numbers, fairly often inland but irregularly and in very small numbers. *H.F.W.*

**Migrations.**—*British Isles.*—Information as to migratory status of British-breeding birds scanty, but most appear to be resident; one ringed Kinross June was recovered co. Donegal following January. Passage-migrants and winter-visitors (ringed birds from Iceland, N. Russia, Holland, and Denmark), and probably from other areas, arrive N. and E. coasts Gt. Britain and Ireland (some from farther N. and E. travelling via Denmark) mid-Sept. to mid-Oct. (early dates, Aug. 4, 1916, Essex; 11 (W. Eagle Clarke); 13, 1936, Surrey; 14, 1937, Cambs; 25, Suffolk). Numbers of passage-migrants in most years apparently small and no information as to their destination beyond Brit. Is. Return passage, very well marked in some years, mid-Mar.

to end April, our winter-visitors leaving with them. Occasional stragglers in May and sometimes June. *N.F.T.*

**Distribution Abroad.**—A Holarctic species. Typical race breeds in Europe north to Iceland, Spitsbergen (once), Færoes, N. Norway to 70°, Sweden, Finland and N. Russia (Petchora delta, Waigatz, and east to Urals): in Asia across Siberia (72½° on Yenisei) and east to Kamtschatka, Commander Is., Kuriles. In south to S. Spain (local), S. and central France, Holland (rare), Denmark: in Norway south to Östland, in Sweden, Skane, Germany and Austria, Czecho-Slovakia, Hungary, Romania, Russia (to 48° and Caucasia): in Asia south from Aralo-Caspian region and Turkestan to Altai, Semipalatinsk, and Tarbagatai. Replaced in N. America by *A. a. tzitzihoa*, breeding from Alaska to Hudson Bay in north and south to S. California and Michigan. Migrates through Mediterranean region and N. Africa south to Kordofan, Shoa, and British E. Africa: in Asia to Indian Ocean from S. Arabia, Ceylon, Burma, Formosa, Japan, Borneo, and Philippines: American race south to Hawaii, Panama, and W. Indies. Casual in Jan Mayen, Bear Is., and Madeira. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) crown black-brown, centre of nape black glossed dull green, all feathers when fresh tipped buff; broad white band from hinder-crown parallel with nape to side of breast; mantle finely vermiculated blackish-grey and white; upper scapulars as mantle, others with coarse vermiculations of black and light buff and with distal halves black on outer web, long tapering ones black bordered drab-grey (some with a cream-buff streak, and often freckled cream), lower ones drab-grey; back and rump mouse-grey, feathers often freckled cream; at sides of rump patch of cream-buff; central upper tail-coverts shaded grey with black shafts and cream-buff edges, outer ones with outer webs black; (*sides of head* and *under-parts*) cheeks, sides of neck, chin, throat and fore-neck brown, patch on side of neck in some lights glossed green or bronze-pink; sides of body and flanks vermiculated blackish-grey and white; breast and belly white; lower-belly and vent white finely freckled dusky-grey; under tail-coverts black, some mottled and long ones bordered white; axillaries white with brown shafts; coverts at edge and bend of wing and under lesser coverts mouse-grey, rest of under wing-coverts white freckled dusky-brown; central pair of *tail-feathers* black, next pair with outer web black, inner web grey, shading to buff at border, others with outer webs blackish-grey edged white, inner webs mouse-grey, remainder mouse-grey paler on inner webs and edged light buff; *primaries* sepia, paler on inner webs; *secondaries* sepia with broad white tips sometimes suffused light pink-cinnamon on outer webs, secondaries of *speculum* with outer webs metallic-green, in some lights glossed bronze-pink with a subterminal border of velvet-black, innermost light mouse-grey with broad black shaft-streaks, one bordering speculum with inner web sepia, outer black with a light grey streak next shaft; *primary-coverts* and *bastard-wing* as primaries but median and lesser primary-coverts mouse-grey with dark shaft-streaks and buff frecklings; *greater coverts* mouse-grey with broad cinnamon tips and frecklings, absent on inner ones; *median* and *lesser coverts* mouse-grey with dark shaft-streaks. This plumage is acquired by a moult of body, tail and innermost secondaries Aug. to Jan.

ADULT MALE. ECLIPSE.—The body-feathers are first moulted, followed by wings and tail June to Aug. May be confused with juvenile male rather than adult female, from latter at once distinguished by absence of broad buff edges to feathers of upper-parts, while under-parts are not so heavily spotted and streaked as in juvenile. *Head* and *neck* as adult female; (*upper-parts*) feathers of mantle, back and rump blackish-grey tipped greyish-olive, many barred and freckled white or buff; short scapulars as mantle but darker, mostly tipped buff, rest black or black-brown with light mouse-grey edges and tipped buff; upper tail-coverts sepia irregularly barred and edged buff or cream; (*under-parts*) feathers of upper-breast with irregular markings of sepia and ashy-white more or less concealed by broad buff fringes; sides of body and flanks sepia, feathers with broad irregular U-shaped light buff or white bars and with broad white fringes, many more or less vermiculated white; lower-breast and belly white or ash-white, feathers mostly with brown oval spots; lower belly and vent marked dusky-brown, feathers broadly tipped white or buff and irregularly barred and vermiculated white; under tail-coverts white, irregularly marked sepia; central pair of *tail-feathers* brown, next pair edged buff, inner webs mouse-grey, all feathers broader at tip than in winter; *wing* as winter but new innermost secondaries with tips rounder and less pointed and in some edged light buff. *N.B.*—Another type of eclipse has feathers of *mantle, scapulars, back* and part of *rump* dark ash-grey or blackish-grey, more or less coarsely vermiculated greyish-white; *sides of body* and *flanks* usually not so strongly barred and more or less vermiculated ash-brown and white. Every intermediate phase occurs between these two types. Amount and degree of spotting on *under-parts* varies considerably.

ADULT FEMALE. ECLIPSE.—(*Upper-parts*) crown streaked black-brown, feathers broadly edged cinnamon; nape pink-buff narrowly streaked dusky; rest of upper-parts black-brown, feathers with broad U-shaped marks of light or pink buff and edged same; (*sides of head* and *under-parts*) cheeks and sides of neck buff narrowly streaked black-brown; chin, throat and fore-neck light buff, with small dusky spots, in some chin and throat uniform; feathers of upper-breast with brown centres more or less concealed by broad cream-buff fringes; sides of body and flanks light sepia with irregular U-shaped buff markings and edged same; lower-breast white, feathers with imperfectly concealed dusky-brown bases; belly and vent white or cream, spotted, mottled and streaked dusky-brown; under tail-coverts white with irregular markings of pale sepia; axillaries white marked dusky-brown; under wing-coverts ash-brown edged white; *tail-feathers*: central pair black-brown, remainder sepia edged cream and all more or less with irregular streaks and bars of pink- or cream-buff; *wing* as male but green *speculum* usually absent or ill-defined, outer *secondaries* streaked and margined buff on outer web, rest with outer-webs buff-brown, sometimes mottled black, in some lights with a greenish or coppery-pink tinge, black sub-terminal border narrower often ill-defined, and white tips narrower than in male, innermost secondaries sepia narrowly bordered white or buff, one next speculum sepia tipped white, outer web often black-brown; *wing-coverts* pale sepia, *greater coverts* with broad pink-buff tips; *median* and *lesser coverts* narrowly edged and sometimes barred buff. This plumage is acquired by a complete moult in autumn. *N.B.*—A type of female occurs with breast, belly and vent more or less heavily spotted sepia.

ADULT FEMALE. SUMMER.—Most body-feathers, central pair of tail-feathers (sometimes most tail-feathers) and sometimes some innermost secondaries are moulted March to May but not rest of wings. Coloration as eclipse but *upper-parts* and new *tail-feathers* usually more broadly margined and barred with deeper buff, new innermost *secondaries* broadly edged and irregularly streaked pink-buff or pink-cinnamon. *Nest-down* is acquired in spring.

NESTLING.—Pattern of upper-parts similar to nestling Mallard but upper-parts light sepia, down-filaments tinged cream-buff and yellow markings replaced by white; patch on either side of centre of back sometimes continued into an elongated streak towards rump; eye-stripe white, and sometimes continuous with white streak down side of nape to breast; line through eye to nape light sepia, ill-defined bordering nape; cheeks below eye white with an irregular patch of light sepia; under-parts greyish-white, fore-neck suffused cinnamon-buff or greyish-buff.

JUVENILE. MALE.—Like eclipse female but *upper-parts* darker, feathers of mantle barred cream and without pink-buff edgings and markings, and cheeks and sides of head paler than in adult female ; *under-parts* heavily streaked or spotted dusky-brown ; *tail-feathers* dark sepia edged and more or less irregularly barred and streaked cream ; *wing* as adult male but white tips to secondaries and cinnamon tips to *greater coverts* narrower and innermost *secondaries* brown, paler on outer webs, which in some are mouse-grey and narrowly edged cream, one bordering speculum as in adult but shorter and usually more broadly tipped white ; innermost *greater coverts* sepia with light buff edges ; *median* and *lesser coverts* usually browner mouse-grey than in adult and usually narrowly edged cream, inner median coverts in some with a wavy cream bar. *N.B.*—There is also a type of juvenile with mantle partly vermiculated white as well as barred. FEMALE.—As male but *mantle* unbarred and *wing* as adult female; innermost *secondaries* plainer than in adult female and without buff markings (in some darker, black-brown rather than sepia) narrowly edged white and in some irregularly marked same. (See also dark dots on bill under "Soft Parts.")

FIRST WINTER AND SUMMER. MALE.—As adult male and only to be distinguished by some juvenile feathers of *back* and *rump* which are often retained, shorter central *tail-feathers* and retained juvenile *wing-coverts*. The juvenile body-feathers, not always back and rump (which are sometimes incompletely moulted), tail (in some outer tail-feathers are retained), all innermost secondaries (including one next speculum) and coverts, but not rest of wings, are moulted Sept. to Feb. or March.

FIRST WINTER. FEMALE.—As adult female eclipse and apparently not distinguishable except by more worn appearance of *median* and *lesser coverts* with narrower buff edges. Moult apparently as in male. FIRST SUMMER.—Like adult summer female but *mantle, scapulars,* new feathers of *back* and *rump, upper-tail coverts,* new *tail-feathers* and innermost *secondaries* less richly marked with buff and edges narrower and paler. Most body-feathers, some tail-feathers and innermost secondaries are moulted in spring.

MEASUREMENTS AND STRUCTURE.—♂ wing 262–280 mm., tail 177–209, tarsus 39–42, bill from feathers 48–53 (12 measured). ♀ wing 242–266, bill 45–50. Primaries : 1st narrow, pointed and more than half longest primary-covert, 3rd longest, 2nd equal or 2–4 mm. shorter, 4th 8–13 shorter, 5th 22–27 shorter, 6th 37–45 shorter ; 2nd emarginated inner, 3rd and 4th slightly outer web. Innermost secondaries long and tapering, longest between 5th and 6th primaries, in eclipse broader at tip. Scapulars pointed and tapering, in eclipse shorter and with rounded tips. Tail with 16 feathers tapering to a point, central pair lanceolate and considerably longer than rest, in eclipse broader and less pointed, central pair broadly lanceolated and only slightly exceeding next pair in length. Bill longer than head, narrow, edges nearly parallel, terminal two-thirds of culmen straight and nearly horizontal, basal portion rapidly ascending.

SOFT PARTS.—Bill (ad. ♂) pale plumbeous-blue, nail, base and strip along culmen black, (ad. ♀) bluish-horn, (juv.) blackish-grey ; ♀ ad. and juv. with small dark dot or dots on lower edge of upper mandible (H. Wormald) ; legs and feet (ad. ♂) greyish, joints darker, webs black, (ad. ♀ and juv.) greenish-grey ; iris brown. [*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Green speculum and mouse-grey wing-coverts together with long neck and size distinguish adult and juvenile males from other British ducks ; adult and juvenile females might possibly be confused with young Wigeon and Gadwall but may at once be distinguished by inner secondary next speculum having no white on outer web except at tip. In *A. a. tzitzihoa* (N. America) males have speculum broader and when fully adult tail longer. [*A.C.M.*]

## Genus SPATULA Boie

SPATULA Boie, Isis, 1822, i, col. 564 (Monotype: *S. clypeata*).

Agrees with *Anas* in structure, except in bill, which is rather longer than head, in front very flat and enormously widened, being twice as broad as at base. Lamellæ very fine, long, close together. Fourteen rectrices. Sexes different. Four species, of which one only in northern hemisphere.

*PLATES 80, 82, 85a, and 86.*

### 326. THE SHOVELER—Spatula clypeata (L.)

ANAS CLYPEATA Linnæus, Syst. Nat., ed. x, i, p. 124 (1758—Restricted typica locality: S. Sweden).
*Anas Rufigaster* Latham, Suppl. Gen. Synops. B., i, p. 297 (1787—Ex " Red-breasted Shoveler," Gen. Synops. B., iii, 2, p. 512, 1785—Lincolnshire).
*Spatula clypeata* (Linnæus), Yarrell, iv, p. 375; Saunders, p. 427; Pract. Handb., ii, p. 303.

**Habitat.**—Owing to its feeding-habits requires shallow and muddy waters. In breeding-season, though regularly frequenting open lakes, lochs and reservoirs, usually with grassy borders, is most addicted to reedy meres, pools and creeks of marshes and damp grasslands, bogs, swamps, sewage-farms and the like with ample cover. Outside breeding-season more widely distributed on suitable shallow, fresh or brackish waters. In India occurs regularly on small and filthy village pools. Rests on sea at times, but except under stress of weather or sometimes on migration, visits salt-water less than other surface-feeders except Garganey. *B.W.T.*

**Field-characters and General Habits.**—Outstanding character on water or in flight is *enormous spatulate bill*. Plumage pattern of drake is also very striking and distinctive: *head dark green, breast and scapulars white, flanks and belly chestnut*, separated by white patch from black under tail-coverts, centre of back dark brown. *Pale blue fore-wing* is also noticeable in flight; in female it is a good deal duller, and often not noticeable, but may be so in a good light. Female's plumage otherwise resembles Mallard duck, but on water, in addition to bill, her rather smaller size, shorter neck, heavier build and different carriage distinguish her. Swims with fore-parts deeply sunk and heavy bill inclined downwards. In flight disproportionate size of bill makes wings appear set far back. Speculum green with white wing-bar in front and narrow white border behind. Legs orange, duller in female; bill blackish in male, brownish with some orange at base in female. Drake remains long in eclipse; full plumage often not complete till Dec., and lasting till about May-June, eclipse being complete from about July to Sept. or later. Eclipse of drake is much like female except for brighter colouring of wings, but back tends to be darker and more uniform. Juveniles are much the same, but wings duller. Change of juvenile drake to adult plumage, like that of adults out of eclipse, is very slow; moult begins about Aug., but little change takes place till about end Jan. or Feb., when adult feathering begins to become more obvious, being fairly well-developed, though often still patchy, by April. Owing to slowness of moult drakes in all sorts of odd intermediate states of plumage are seen more commonly and through a larger part of year than in any other species of surface-feeding duck. Length *c.* 20 ins.; body *c.* 12 ins.

Is active flier and spends much time on wing in spring; wing-beats rapid, but flight less swift than Mallard's. Will rise almost as abruptly as Teal, with loud rattle of wings; and will twist and take "headers" like that species, though by no means so agile on the wing; flight resembles that of Wigeon and Gadwall. Poor walker. Usually occurs singly or in pairs and parties up to 20 or so, though at times in large flocks, mainly during migration. According to Millais usually arrives in suitable localities in spring in one large flock, which then gradually disperses, but such flocks may consist largely of passage birds, as at such times many more will appear temporarily on a given water than breed locally. Typical mode of feeding is paddling rapidly about with head carried low all the time and bill continuously dabbling in water, as it sieves out small organisms and edible particles through comb-like lamellæ of bill; dabbles similarly in mud of shallows and at water's edge and is also active in capture of aquatic insects. A habit of pairs (Millais) or 3–4 birds together (O. Heinroth) of swimming round in circle, head to tail, with bills immersed and allowing water to run through them may be purely co-operative device to stir up food, but seems to have acquired a certain ceremonial character (see under "Display"). Less fond of "up-ending" than most surface-feeders, though doing so quite freely at times, and on rare occasions dives fairly freely for food. C. Oldham records an adult diving some thirty times in a few minutes, remaining under 6–7 secs., and B. Lloyd, who watched a pair doing so, apparently in intervals of catching gnats, found that "they seemed to plunge or rather rush obliquely under the water, rather than to dive at all neatly." J. S. Carter also records diving by male in display, by female to avoid attentions of displaying males, and by male to avoid attack by another. *B.W.T.*

**Voice.**—Rather a silent bird. Flight-call and display note of male is a low, guttural "took, took." At times uses a creaking "quack" (C. Oldham); this is female's note. T. A. Coward describes deep quack, lower-pitched than Mallard's, and states that both sexes use it, but this requires confirmation. *B.W.T.*

**Display and Posturing.**—Display is simple and undemonstrative. Both sexes raise and lower head, keeping bill approximately horizontal. B.W.T. has observed this as late as the end of March amongst birds apparently already paired. Millais describes male swimming up to female uttering low, guttural croak, and at same time elevating head and neck and jerking bill upwards; female bows in return and both sexes swim round in circles as described under "Habits." Aerial chases of two or more males after female are of regular occurrence and Millais emphasizes tendency to polyandry. Raising and lowering of head is also used in aggression (J. S. Carter). "Injury-feigning" occasionally recorded. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds on meadows near water: in open patches among reed-beds, on gorse-covered commons and heaths, generally in open site. *Nest.*—A hollow, usually on dry ground, with some shelter from grass, heather, dead reeds, etc., lined with grass, down, and feathers. The down is brown with light centres, and taken alone might be confused with Pintail's or Wigeon's, but the feathers (see Plate 85A) will generally distinguish it from former, and colour of eggs from latter. *Eggs.*—Usually 8 to 12 (often 11) but 7 to 14 recorded, nearly always with a tinge of green, though sometimes almost buff, ovate and smooth. Average of 100 British eggs, 51·99×37·17.

Max.: 55·6×38 and 53·2×39. Min.: 47·1×37·1 and 48·6×35 mm. Average weight (E. Rey), 3 grams (3·4 to 2·2 gr.). *Breeding-season.*—From beginning of April onward, but many pairs do not lay till late in month, and in Scotland fresh eggs may be found through May. *Incubation.*—By duck alone, begins with last egg. Period 23–25 days. *Fledging.*—Young tended by duck: male occasionally noted in attendance. Period about 6 weeks. Single-brooded. *F.C.R.J.*

**Food.**—Both animal and vegetable matter, but the latter apparently preponderating. Buds and stems as well as seeds of aquatic plants, including *Glyceria fluitans, Scirpus, Phragmites, Carex, Potamogeton, Lemna,* etc., and on the coast, *Zostera marina,* and various algæ. Animal matter includes Mollusca (*Littorina, Rissoa, Hydrobia, Planorbis,* etc., both fresh- and salt-water species); small Crustacea (Amphipoda and Copepoda (*Cyclops*)); insects (chiefly Coleoptera (water-beetles) and Hymenoptera (*Formica fusca*)). Tadpoles, spawn, and worms have also been recorded. *F.C.R.J.*

**Distribution.**—*British Isles.*—Summer-resident, passage-migrant and winter-visitor. Forsakes most breeding-places in autumn and then, as well as in winter, more widely distributed and on some waters in large numbers especially in spring. As breeding-bird has greatly increased and extended range during last 50–60 years and chiefly during present century and continues to do so. In *England* now breeds in varying numbers in all counties except following where no nest yet recorded or only exceptionally: Cornwall, Wilts, Surrey, Worcester and Northampton, Derby (2 pairs 1937, also 1938), Middlesex (probably bred 1935), Gloucester (suspected but no proof). In *Wales* breeds Glamorgan, Carmarthen, Pembroke and Anglesey, and has bred Merioneth. In *Scotland* breeds on mainland in many counties, principally S. and E. up to Loch Ness and E. Inverness and E. Ross, but not recorded for Selkirk, Peebles, Ayr, Stirling, W. Lothian, Clackmannan, Kincardine, Banff and Nairn, and only once Argyll; also does not breed W. Inverness and W. Ross, has bred once Sutherland and breeds somewhat irregularly in Caithness. In I. Hebrides breeds chiefly Tiree, but also Islay, in O. Hebrides, in N. and S. Uist and Benbecula; also breeds in Orkneys, but in Shetlands has only once occurred and never bred. In *Ireland* breeds every province. *H.F.W.*

**Migrations.**—*British Isles.*—British breeding-birds are summer-residents arriving with passage-migrants end Feb. or Mar. and leaving Aug. and Sept. Extent of migration unknown, though some at any rate do not appear to leave Brit. Is. One nestling ringed Lancs in May recovered Holland Jan. 2½ years later. Passage-migrants and winter-visitors arrive E. coast, in so far as recoveries of marked birds tell us from Holland, Denmark and N. Germany, mid-Sept. to Nov., and some pass to Ireland. Destination of passage-migrants beyond Brit. Is. unknown. Return passage spring much better marked than autumn end Feb. to end Apr., mostly during Mar. *N.F.T.*

**Distribution Abroad.**—Holarctic region. In Europe breeds north to Denmark, S., S.W. and N.W. Sweden, Finland, and Russia (Lower Petchora): in Asia from Lower Ob through Siberia east to R. Kolyma and Ussuria, Commander Is. and Japan (Hokkaido). In south to S. Spain (exceptional), France, Corsica (has bred), Germany, Austria, Yugo-Slavia, Macedonia, Bulgaria, Romania, and S. Russia (Crimea and Caucasia): in Asia from Transcaspia and Kirghiz Steppes to Altai, Transbaikalia, and N.W. Mongolia.

In America from W. Alaska, Gt. Slave Lake, and Saskatchewan south to Iowa, Nebraska, Kansas, New Mexico, Arizona, S. California, Indiana, Illinois, and Texas. Migrates through S. Europe, the Mediterranean region, and N. Africa to tropical Africa (Senegambia, Gold Coast, Kenya, Uganda): also to S. coasts of Asia, Ceylon, China, Formosa, and Borneo, Philippines, etc. In America winters south to central America, W. Indies, Colombia, and Hawaiian Is. Casual Madeira, Canaries, Cape Colony (once): also Bermuda. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head* and *neck*) crown brown-black glossed dull green; nape, cheeks and sides of neck metallic blue-green (in some lights glossed violet-mauve); lores, chin, throat and fore-neck dull black slightly glossed green; (*upper-parts*) centre of mantle dark brown, feathers edged and a few freckled white; sides of upper-mantle white; short scapulars white, some tipped or freckled dusky and with inner webs and tips black-brown or intermixed with black feathers, two long scapulars on either side pale blue, one with white stripe on inner web along shaft and bordered dull green, remainder dull green, some with brown shaft-streaks; back, rump and upper tail-coverts black-brown glossed metallic-green, sides of rump white; long upper tail-coverts sepia edged creamy; (*under-parts*) upper-breast white (some eclipse feathers often retained with subterminal semi-circular bands); sides of body and flanks pink-cinnamon with numerous fine wavy bars of black; centre of breast, belly and vent bay, when fresh, feathers narrowly edged white (sometimes barred or spotted blackish), and those of lower-belly and vent in some more or less barred dusky; under tail-coverts black glossed dull green, short ones with bases white and more or less vermiculated black, long ones with buff bars and frecklings towards tip; axillaries and under wing-coverts white; central pair of *tail-feathers* sepia tinged olive and edged or mottled white, others with outer webs sepia, inner webs white or buffish-white freckled dusky, outer ones mostly white with brown shafts; *primaries* sepia paler on inner webs; *secondaries* sepia (sometimes faintly tipped white on outer webs), all save two outer ones metallic-green on outer webs, innermost with outer webs blackish blue-green or dark green, inner webs olive-brown and with narrow white shaft-streaks towards tip; bastard-wing sepia; *primary-coverts* sepia but the median and lesser ones tinged blue; *greater coverts* sepia with broad white tips (sometimes with dusky spot at tip of inner web), inner ones olive-brown, tips shaded blue or green; *median* and *lesser coverts* pale blue, sepia at base. This plumage is acquired by a moult of body-feathers, central pair of tail-feathers and innermost secondaries Aug. to Dec.

ADULT MALE. ECLIPSE.—The body-feathers and central pair of tail-feathers are first moulted, followed by wings and rest of tail May (exceptionally April) to Aug. *Upper-parts* somewhat resemble juvenile male and adult eclipse female, *under-parts* adult eclipse female, but easily distinguished from former by under-parts, fresh new tail-feathers and much longer innermost secondaries, and from latter by more brilliant wing. (*Upper-parts*) crown and nape as eclipse female; mantle and scapulars as eclipse female, but without bars and scapulars often edged white instead of buff, lower scapulars longer and with more pronounced buff or white shaft-streaks; back and rump as winter-summer male; at sides of root of tail usually a patch of white feathers barred black-brown; upper tail-coverts sepia glossed green and usually edged and sometimes barred buff; *under-parts* as eclipse female but usually more heavily streaked or plentifully marked; lower breast, belly and vent cinnamon, many feathers with sepia marks; central pair of *tail-feathers* sepia narrowly edged white; *wing* as adult winter, but innermost *secondaries* broader and less pointed at tip. *N.B.*—Sometimes during moult from eclipse to winter-summer, sepia scapulars barred buff or white or irregularly freckled and broadly edged white, and white breast-feathers with subterminal black-brown bars and pink-buff tips are acquired. These feathers are subsequently shed.

ADULT FEMALE. ECLIPSE.—(*Upper-parts*) fore-head and crown black-brown, with a greenish gloss, feathers edged pink-buff, centre of nape ash-brown, rest pink-buff narrowly streaked dusky-brown; mantle and scapulars sepia (sometimes with greenish gloss), feathers fringed pink-buff, sometimes some with V- or U-shaped buff bars, lowest scapulars tinged dull green on outer web; back sepia (sometimes glossed green), feathers edged pink-buff, rump and upper tail-coverts same but mostly with V-shaped pink-buff markings; (*sides of head* and *under-parts*) from base of culmen to nape a pink-buff eye-stripe streaked sepia (sometimes ill-defined); patch in front of eye and streak behind eye to nape thickly streaked black-brown; cheeks, sides of neck and fore-neck pink-buff narrowly streaked black-brown; chin and throat pink-buff; feathers of breast, belly, flanks and vent with brown centres more or less concealed by broad pink-buff or pink-cinnamon fringes and usually irregularly marked same; under tail-coverts buff with oval or transverse sepia markings; axillaries and under wing-coverts as male, those at edge of wing with sepia centres; central *tail-feathers* sepia, remainder ash-brown all broadly edged pink-buff and mostly irregularly marked buff, outer ones more or less pink-buff; *wing* as male but green *speculum* usually less developed, four outer secondaries with outer webs dull greenish-brown or greenish-black, *secondaries* usually narrowly edged white at tip of outer web, innermost secondaries sepia glossed olive and edged pink-buff and usually with light shaft-streak towards tip; *greater coverts* with narrower white tips, inner ones olive-brown, some tinged dull blue and edged light buff or white; *median* and *lesser coverts* duller blue than in male with narrow buff edges (sometimes absent). This plumage is acquired by a complete moult July to Sept.

ADULT FEMALE. WINTER AND SUMMER.—The body-feathers, some tail-feathers, innermost secondaries but not wings are moulted Dec. to April. Feathers of *head* and *neck* with broader pink-buff edges than in eclipse; (*upper-parts*) feathers of mantle and scapulars and upper tail-coverts sepia (sometimes black-brown) with broad crescent or transverse light or pink-buff markings and broad edges of same, some scapulars tinged olive; feathers of back and rump sepia or black-brown with broad pink-buff edges and bars, those of rump with crescent-shaped marks; *under-parts* and *tail* as winter; *wing* as winter but innermost *secondaries* with broader edges and more or less irregularly shaded light buff. *Nest-down* is acquired in spring. *N.B.*—In late summer under-parts appear more or less spotted owing to abrasion of edges and exposure of dusky-brown bases.

NESTLING.—Similar to that of Mallard but upper-parts usually darker, down filaments tipped cinnamon-buff rather than yellowish, yellow patches on upper-parts paler and in some ill-defined, no light bar on wing; cheeks and eye-stripe cinnamon-buff not yellow-buff, a black-brown line through eye and an incomplete line below it as in Mallard; chin and throat cinnamon-buff; fore-neck same or greyish-buff; remaining under-parts greyish-white occasionally suffused cream-yellow. Older nestlings are easily identified by shape of bill.

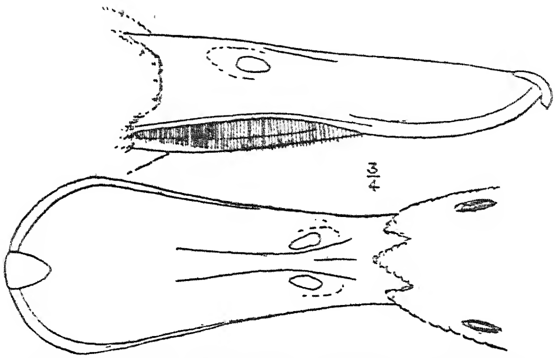
JUVENILE. MALE.—Like adult eclipse female but *under-parts* narrowly streaked light sepia, *median* and *lesser coverts* as adult male but duller; *upper-parts* as eclipse female, mantle without bars; back and rump brown glossed dull green; patch at side of root of tail buff, feathers barred, tipped or spotted light brown; (*sides of head* and *under-parts*) cheeks, sides of neck, chin, throat and fore-neck as eclipse female but paler buff and rather more finely streaked; feathers of upper-breast, sides of body and flanks and under tail-coverts light sepia edged and sometimes barred or spotted cinnamon-buff, longer under tail-coverts as eclipse female; feathers of centre of breast, belly and vent narrowly streaked or spotted dusky-brown and tipped and sometimes barred pink-buff; *tail-feathers* sepia or ash-brown narrowly edged cream-buff; *wing* as adult male but secondaries usually with very distinct white tips to outer webs; *innermost secondaries* with outer webs dull olive-green narrowly tipped whitish, inner webs olive-brown, tips of innermost secondaries rounded not pointed as in adult;

*greater coverts* sometimes with narrower white tips and generally with oval dusky spot at tip of inner web, innermost as innermost secondaries but tipped buff; *median* and *lesser* as adult but in some duller blue, median sometimes shaded buff-brown at tip. FEMALE.—As male but *back* and *rump* browner; patch of barred brown and white feathers at root of tail absent; *wing* as adult female but in some green *speculum* absent, outer webs of secondaries being plain sepia as inner webs or at most glossed dull blackish-green, innermost sepia, in some tinged olive, mostly tipped white on outer web; *greater coverts* sometimes with much narrower white tips and mostly with oval dusky spot at tip of inner web, innermost sepia; *median* and *lesser coverts* usually duller and browner, in some with buff edges as in adult. (See also dark dots on bill and colour of iris under "Soft Parts.")

FIRST WINTER. MALE.—Apt to be confused with adult male eclipse but may be distinguished by lighter *head*, less brilliant green *back* and more uniform *lower-breast*, *belly* and *vent* varying from russet to bay, by worn juvenile *tail-feathers* when not all shed, juvenile innermost *secondaries* and often duller blue *median* and *lesser coverts*, though sometimes these are as brilliant. The juvenile body-feathers, not usually all those of back, not all upper or under tail-coverts, some tail-feathers, but not wings, are moulted Aug. to Oct. FIRST SUMMER.—The body-feathers, apparently not lower-breast, belly or vent, rest of tail-feathers, innermost secondaries and coverts are moulted Nov. to March or even later, backward examples continuing to acquire feathers of breeding plumage up to commencement of moult into eclipse. Difficult to distinguish from adult except by more worn appearance of flight-feathers and by usually duller *wing-coverts* and narrower white tips to *greater coverts*. Sometimes, some dark horse-shoe-shaped markings are retained on white shield of *fore-neck*.

FIRST WINTER. FEMALE.—As adult female eclipse but feathers of *mantle* and *scapulars* edged paler buff; *wing* as juvenile and distinguished from adult usually by duller *speculum* but sometimes as brilliant as adult, *median* and *lesser coverts* usually duller and browner. The juvenile body-feathers, not always back and rump, tail-feathers and occasionally innermost secondaries and coverts are moulted Aug. to Jan. FIRST SUMMER.—Moult as in adult female but usually only central pair of tail-feathers renewed. Plumage as adult female and only to be distinguished by *speculum* and *median* and *lesser coverts* being sometimes duller.

MEASUREMENTS AND STRUCTURE.—♂ wing 232–252 mm., tail 73–85, tarsus 32–37, bill from feathers 62–69 (12 measured). ♀ wing 217–235, bill 59–64. Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd equal or 3–5 mm. shorter, 4th 8–10 shorter, 5th 20–26 shorter, 6th 34–40 shorter; 2nd emarginated inner and 3rd outer web. Innermost secondaries long and tapering, longest equals 7th primary or between 6th and 7th, broader and less pointed at tip in eclipse. Scapulars long and tapering, in eclipse shorter and mostly with rounded tips. Tail short and rounded, central pair longest, 14 pointed feathers. Bill longer than head, compressed at base, much expanded and almost spatulate terminally where



Bill of the Shoveler (*Spatula clypeata*) from the side and from above.

about twice as wide as at base ; lamellæ very thin, lengthened, almost completely exposed posteriorly, where they resemble teeth of fine comb.

SOFT PARTS.—Bill (ad. ♂) leaden-black, in eclipse brown, (ad. ♀) greenish-brown above, margins inclining to yellow, lower mandible dull orange, nail brown, (juv.) pink-horn ; ♀ ad. and juv. with small dark dots on lower edge of upper mandible (H. Wormald) ; legs and feet (ad. ♂ and ♀) orange-red, (juv.) orange-brown ; iris (ad. ♂) golden to reddish-orange, (ad. ♀) brown, occasionally yellow, (juv.) ♂ dull yellow, ♀ brown. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Distinguished in all plumages from other British ducks by spoon-shaped bill and well-developed fine comb-like lamellæ, while green or greenish speculum also distinguishes it from Mallard. *H.F.W.*

[NOTE.—Wanderers from captivity or semi-captivity of the BAIKAL or FORMOSAN TEAL, *Anas formosa* Georgi, the CAROLINA or WOOD-DUCK, *Aix sponsa* (L.), the MANDARIN DUCK, *Aix galericulata* (L.) and other species are frequently reported.]

## Genus NETTA Kaup

NETTA Kaup, Skizz. Entwicklungsgesch. u. Natürl. Syst., pp. 102, 196 (1829—Monotype : *N. rufina*).

In structure generally like *Aythya*, but larger, bill rather long, narrower in front than behind, cutting edge straight, colour red or reddish. Serrations of upper mandible short, coarse, directed inwardly. Edge of feathering on sides of bill forming almost a straight line. Sexes different, male fully crested. One species.

*PLATES 87 and 91.*

### 327. THE RED-CRESTED POCHARD—Netta rufina (Pall.)

ANAS RUFINA Pallas, Reise d. versch. Prov. d. Russ. Reichs, ii, p. 713 (1773—S. Russia).
*Fuligula rufina* (Pallas), Yarrell, iv, p. 407 : *Netta rufina* (Pallas), Saunders, p. 441.
*Nyroca rufina* (Pall.), Hand-List (1912), p. 139.
*Netta rufina* (Pall.), Pract. Handb., ii, p. 309.

**Habitat.**—Habitually frequents two rather distinct types of habitat, namely, more or less extensive, moderately deep, reed-fringed sheets of still or slow-moving water with abundant submerged vegetation and open, shallow, saline or brackish lagoons often with little cover. In breeding-season resorts more to smaller pools with abundant cover. Recorded by G. Radde on open sea in winter, but in most districts rarely occurs on sea. *B.W.T.*

**Field-characters and General Habits.**—Male very distinctive, with *crimson bill, rich chestnut head shading to more golden on top, neck, breast, upper tail-coverts and whole under-parts glossy black.* Back mouse-brown, white mark across shoulders, flank-feathers white with deeply serrated brownish pattern where they border wing. *Broad white patch on flight-feathers* extends nearly whole length of expanded wing. Feathers of crown erectile, forming sort of crest and making head look large. Female is only European duck except female Common Scoter which is more or less uniform brown with *pale cheek, but this is much more definite than in Scoter, more greyish in colour and more sharply demarcated from dark brown crown,* while upper-parts are soft, rather light, instead of dark, rather sooty, brown, blackish bill shows more or less orange- or reddish-brown towards tip and there is a *white wing-patch* resembling, though duller than male's. Usually sits noticeably higher on water than most diving ducks. Eclipse plumage of male is assumed early, moult beginning in May; resembles female, but distinguished by much more pronounced crest, greyer fore-wing, whiter wing-patch, and red bill (Millais). Immature males resemble females, but are darker with indications of a crest; mature, but dull, plumage attained by April (Millais). Legs of adult male orange, of female dull yellow. Total length *c.* 22 ins.; body *c.* 14 ins.

Like other diving ducks rises with some difficulty, pattering along surface for some yards and not springing cleanly from water like surface-feeders, but once under way flight is strong and swift, with rapidly moving wings producing faint whistling sound (Millais). More at home on land than other diving ducks, walking not only with greater ease, but with less of a roll and more horizontal carriage. Dives well and freely where water deep enough, but often feeds in shallows by merely reaching down with neck or "up-ending" like surface-feeding ducks. According to de Poncins uses wings under water, but only slowly and intermittently; extreme duration of dive estimated at 30 secs. (Millais). Occasionally even grazes on land. In Europe usually in pairs or small parties, though in favourite localities like the Camargue considerable flocks may be seen, but in Asia flocks of hundreds or even thousands are regular. Except in breeding-season keeps mostly to open water and is not skulking, but is usually considered shy and wary. *B.W.T.*

**Voice.**—Note of female (not often used) a hoarse grating "kur-r-r" similar to that of many diving ducks (C. Oldham); when angry, a sort of soft "quak" (O. Heinroth). Note of male, seldom used except in spring, is a loud, hard, rasping wheeze, extremely disagreeable and unmusical (Phillips); also a low grunt or groan in display (Millais). *B.W.T.*

**Display and Posturing.**—Male throws up body from water to an angle of *c.* 75°, depressing bill to fore part of neck, erecting and spreading crest feathers and uttering note, then falls to water again, lowering crest and emitting low grunt or groan; will also swim round female with depressed bill and expanded crest, while female will swim round male with lowered body and head and neck extended along water (Millais: figd., vol. i, facing p. 8). *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds usually on islands in lagoons with strong growth of salt-bushes (*Salicornia*, *Suæda*, etc.) in S. France, but also in thick willow scrub or beds of sedge and reeds. *Nest.*—Always well in among very dense covert, so as to be at the end of a passage and in partial darkness: built of broken twigs, reeds and vegetation at hand, together with down, feathers, etc. Down brownish with small light centres. Feathers characteristic, mostly with sandy or buff tips (see Plate 91). *Eggs.*—Generally 6–12 or 13, but almost every number up to 18 and once 21 recorded (H. Noll has shown that two birds may lay together), broad and blunt ovate, rather variable in colour, varying from light stone-colour to pale green, sometimes in the same clutch, probably from exhaustion of pigment. Average of 69 eggs (26 by E. Rey), 58·22×41·96. Max.: 62·3×45·1. Min.: 53×41·8 and 53·5×39·6 mm. Average weight (Rey) 4·98 grams (6·05 to 4 gr.). *Breeding-season.*—About mid-May in middle Europe: rather earlier in Mediterranean region. *Incubation.*—By duck alone, beginning on completion of clutch:

drake remaining in vicinity. Period 26–28 days. *Fledging.*—Young tended by duck. Single-brooded. (For notes on this species see H. Noll, *Journ. f. Ornith.*, 1929, *Festschr.*, pp. 208–220.) *F.C.R.J.*

**Food.**—Mainly vegetable matter: roots, buds, and seeds of water-plants (*Potamogeton*, *Myriophyllum*, *Ceratophyllum*, *Chara*, etc.). Also occasionally small fish, frogs, tadpoles and spawn, small Crustacea (crabs) and Mollusca: also water-insects and larvæ, but few details available. *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant (chiefly Sept. to Mar.). Since the first in July, 1818, on nine or ten occasions in Suffolk and Norfolk, besides flock of thirteen at Breydon in Sept., 1906. Others recorded (all autumn or winter), chiefly E. coast England, as follows: Northumberland (one), Yorks (one, Jan., 1900), Lincs (two), Cambs (two or more), Essex (two), mouth of Thames (flock of 18), Staffs (one), Bucks and Herts (Tring Reservoirs, flock of about 40 aut. 1889 or 1890 besides others), Sussex (flock of 14–16, Jan., 1911), Hants (one), Dorset (one), Devon (two), Cornwall (one), Pembroke (one), Westmorland (two), Argyll (three), Midlothian (one), Kerry (one), Cork (one). Five were seen in Lincs April, 1937, and a pair bred, but these and doubtless others among those recorded in recent years have probably wandered from Woburn, where they have been reared and allowed to fly for a number of years. *H.F.W.*

**Distribution Abroad.**—S. Palæarctic region: in Europe from E. Spain, locally in France, Switzerland, Germany (local), Czecho-Slovakia and Russia, north to 53° on Volga, Samara, and Ufa Govts.: in Asia, north to Transcaspia, Aralo-Caspian region, Kirghiz Steppes, Turkestan, Semipalatinsk, Zaissan and W. Siberia (S.W. Tomsk). Southern limits: S. Spain (formerly Mallorca), Algeria, Sardinia, Sicily, Macedonia, Romania, Russia (Kherson and Voronezh Govts., lower Don, and Caucasia), Syria and Persia to Yarkand. Winters in E. Mediterranean region, south to Italy, Balkan peninsula, W. Asia Minor, Cyprus, Egypt, Iraq, Baluchistan, Afghanistan, India, Ceylon, and Burma. Occasional in N. France, Belgium, Holland, Denmark, Sweden, Baltic states, Poland, Hungary, W. Russia. Accidental Malta and U.S.A. (New York). *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head and crest cinnamon-rufous shading to paler on hinder-crown; nape and upper-mantle dull black; mantle and scapulars drab, lowest scapulars mouse-grey; broad white crescentic patch across base of scapulars; back drab, lower-back, rump and upper tail-coverts black glossed dull green (in some long tail-coverts drab); *rest of head* and *neck* pinkish-vinaceous, lower-neck all round black; (*under-parts*) patch on sides of breast and belly white, feathers usually tipped or finely vermiculated dusky; sides of body and flanks drab intermixed with white feathers more or less freckled dusky and sometimes tipped drab; rest of under-parts black, sometimes brown-black; axillaries and under wing-coverts white; *tail-feathers* drab-grey, outer ones with inner webs paler; *primaries* hair-brown, inner webs and inner primaries except at tip, white suffused pale drab; *secondaries* white suffused pale drab with a subterminal hair-brown band and white tip, inner ones drab-grey, innermost drab; *primary-coverts* and *bastard-wing* hair-brown; lesser primary-coverts white; rest of *wing-coverts* light drab; *lesser coverts* bordering edge and bend of wing white. No moulting birds examined.

ADULT MALE. ECLIPSE.—(Not examined.) J. G. Millais states that it is very like adult female but distinguishable by wings, darker colour of under-parts, and longer and more pronounced crest. Cheeks whiter than female and bill red (H. Wormald).

ADULT FEMALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head, crown, crest, and sides of head to level with eye cinnamon-brown, crest much less developed than in male; nape and mantle drab-brown; scapulars and upper tail-coverts yellowish-drab or buff-brown, lower scapulars, back and rump olive-brown; (*sides of head* and *under-parts*) lores, cheeks, chin, throat and rest of neck greyish-white; upper-breast drab, feathers fringed yellowish-white; sides of body and flanks yellowish-drab, feathers fringed white; rest of under-parts pale drab-grey, feathers fringed ashy-white; lower under tail-coverts, axillaries, and most under wing-coverts white; *tail* and *wing* as in male, but white of *primaries* and *secondaries* washed palest drab and *lesser coverts* bordering edge of wing ashy-white. *N.B.*—No spring material examined and only summer birds seen (one May, one June in Tring Mus.) were in worn plumage and possibly birds of previous year.

NESTLING.—Crown, nape, upper-parts and sides of body sepia, down with long greenish-golden tips; bar across wing, patches on sides of back and sides of base of uropygial tuft and at base of femur pale yellow; ill-defined sepia streak through eye; cheeks, sides of neck and remaining under-parts pale yellow, shading to whitish on upper-breast, belly, vent, and under tail-coverts; down round tibia and extending slightly on to vent sepia.

JUVENILE. MALE.—Apparently like adult female but only sexed specimen examined had partially acquired first winter-summer plumage on head and neck. Feathers of *under-parts* smaller than in adult female and drab-grey with yellowish-white or white tips, drab-grey bases only partially concealed giving under-parts a mottled appearance as in juvenile Pochard; *tail-feathers* very worn but apparently coloration as in adult, tips square with bare shaft projecting; *wing* as in adult but innermost *secondaries* narrower and apparently with more pointed tips. FEMALE.—Apparently as adult female, but *crest* absent; *under-parts* and *tail* as in juvenile male; *wing* apparently as in adult female, but only rather worn specimens examined.

FIRST WINTER AND SUMMER. MALE.—As adult winter but *under-parts* browner, feathers with narrower black tips and narrow white edges. The juvenile body-plumage, tail and innermost secondaries and coverts are moulted from autumn (?) to spring but not rest of wings. FEMALE.—Probably identical with adult female, but no certain example examined.

MEASUREMENTS AND STRUCTURE.—♂ wing 256–278 mm., tail 58–74, tarsus 40–43, bill from feathers 48–52 (12 measured). ♀ wing 249–269, bill 44–50. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd longest, 3rd equal or 2–3 mm. shorter, 4th 9–13 shorter, 5th 21–27 shorter, 6th 39–44 shorter; 2nd emarginated inner, 3rd outer webs. Innermost secondaries of moderate length, more or less pointed towards tip, longest between 5th and 6th primaries. Scapulars moderately long, tips slightly rounded. Tail rounded, 16 feathers. Adult male with a much-developed crest. Bill broad and flattened at base, slightly narrowing towards tip, culmen slightly concave beyond anterior corner of nostril, nail considerably decurved; lamellæ of upper mandible projecting.

SOFT PARTS.—Bill (ad. ♂) bright vermilion-red, nail flesh-pink, (ad. ♀) dusky-black, paler and reddish towards nail and along cutting edge, (juv.) dusky above, brownish below (Hume); legs and feet (ad. ♂) orange-red or vermilion-red, joints, edges of scutes and webs slatish, (ad. ♀) pinkish, webs black, (juv. ♂) olivaceous-orange; iris (ad. ♂) reddish-brown or orange-red, (ad. ♀) hazel, (juv. ♂) brown or reddish-brown becoming orange-red or red in spring. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Distinguished in all plumages from other British ducks by white speculum bordered above and below with drab (in ♀ suffused drab), and uniform drab wing-coverts. [*A.C.M.*]

## Genus **AYTHYA** Boie[1]

*Aythya* Boie, Tagebuch Reise Norwegen, pp. 308 and 351 (1822—Monotype *Aythya marila*=*Anas marila* L.).

Hind-toe with wide lobe of skin. Fourth (outer) toe about as long as third (middle). Bill about as long as head. Culmen slightly concave, bill after tip as wide as at base or slightly wider, nail less wide than half of tip of bill. Edge of feathering on sides of bill forming a convex line. Nostrils much nearer base than centre of bill. Tail much rounded, 14 rectrices. Wings not over long, inner webs of primaries more or less whitish. Sexes different. About 12 species, all continents and most islands. Nests on ground, females do not "quack." Dive for food.

*PLATES 80, 85a, and 87.*

## 328. THE COMMON POCHARD—Aythya ferina (L.)

Anas ferina Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—Europe. Restricted typical locality: Sweden).
*Fuligula ferina* (Linnæus), Yarrell, iv, p. 413; Saunders, p. 443.
*Nyroca ferina ferina* (L.), Pract. Handb., ii, p. 313.

**Habitat.**—In breeding-season resorts to lakes, large ponds, and sluggish streams or backwaters fringed by beds of reeds, iris, etc., or containing islands with vegetation of this sort. At other times frequents wide range of open fresh waters, including lakes and reservoirs entirely without cover, and tidal estuaries, but seldom resorts to sea except as temporary refuge or during frost. Prefers waters of medium depth. *B.W.T.*

**Field-characters and General Habits.**—*Chestnut-red head, vermiculated light grey back and flanks and black breast; upper and under tail-coverts* separate male at once from other British diving ducks. *Female is dull brown with hoary, whitish appearance about base of bill, cheeks, and throat*; back shows vermiculations at close quarters. At reasonably close range and in fair light chestnut heads and black breasts of the males suffice for identification in flight, but absence of any white on wing is another characteristic, valid also for dull-coloured duck; secondaries paler and greyer than primaries. Rather more squat and heavy in build than Tufted Duck. Full plumage of male from end Sept. or later to July; eclipse plumage resembles female, but back much greyer. Juveniles are much like females; some young males are in practically adult (but dull) plumage by end Oct., others not till end of year. Bill of adult light blue with black base and tip, duller in female. Total length *c.* 18 ins.; body *c.* 12 ins.

Flight and general behaviour typical of diving ducks; when disturbed prefers to shift farther out on to open water to flying and when it rises does so in usual laboured manner of the group, pattering over surface for some distance before getting clear, though when well started flight is straight and rapid, with quick beats of rather short wings producing rustling sound at fairly close range. Short flights generally in compact formation, but on longer ones flocks may straggle out into long wavering lines, blunt wedges, and even V-shapes; sometimes parties perform very abrupt headlong de-

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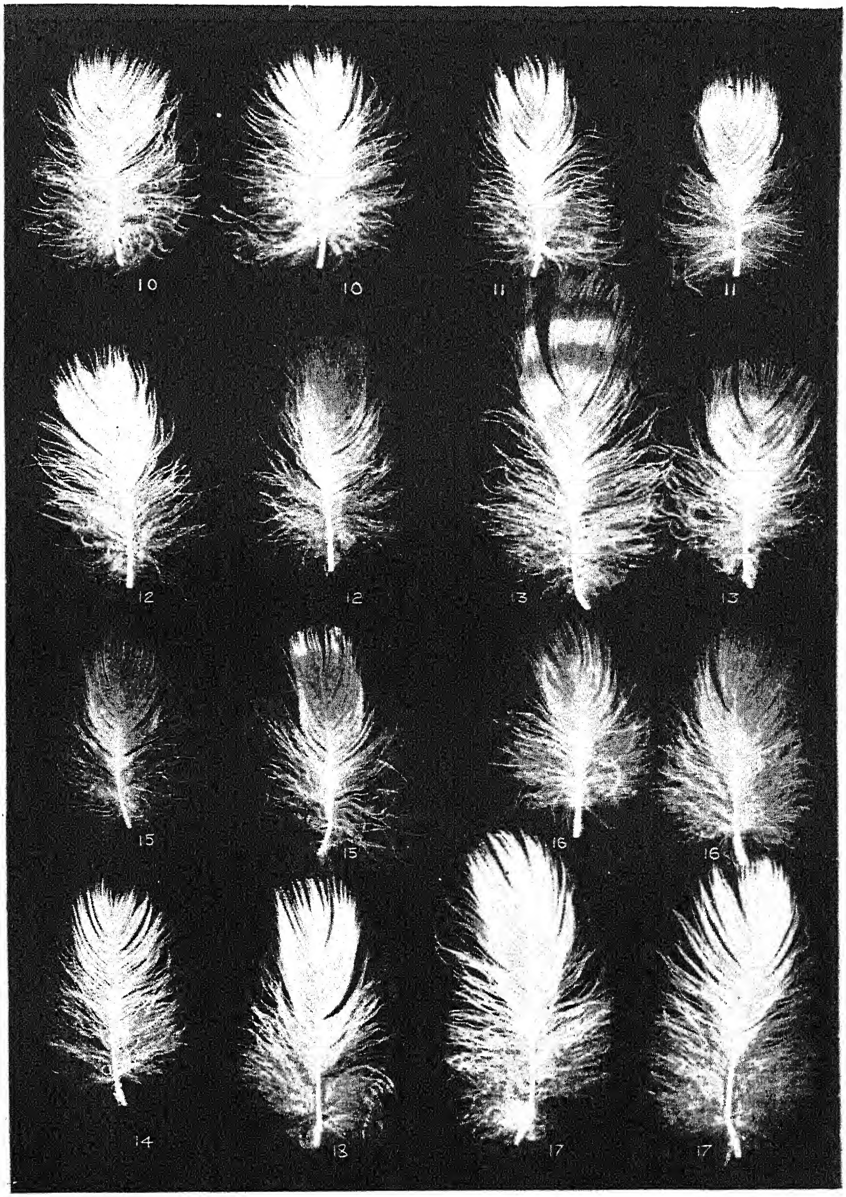
[1] This name must be used in place of *Nyroca* Fleming, *Philosophy of Zoology*, because of its priority (see note under *Tadorna*, p. 221). We do not consider it possible under the Rules to reject *Aythya* because of a previous *Aethia* (1788).

PLATE 87A



FEATHERS FROM NESTS OF DUCKS (*Nat. size*).

10,10. Scaup-Duck. 11, 11. Tufted Duck. 12, 12. Long-tailed Duck. 13, 13. Eider Duck. 14. Golden-eye. 15, 15. Common Scoter. 16, 16. Velvet-Scoter. 17, 17. Goosander. 18. Red-breasted Merganser.

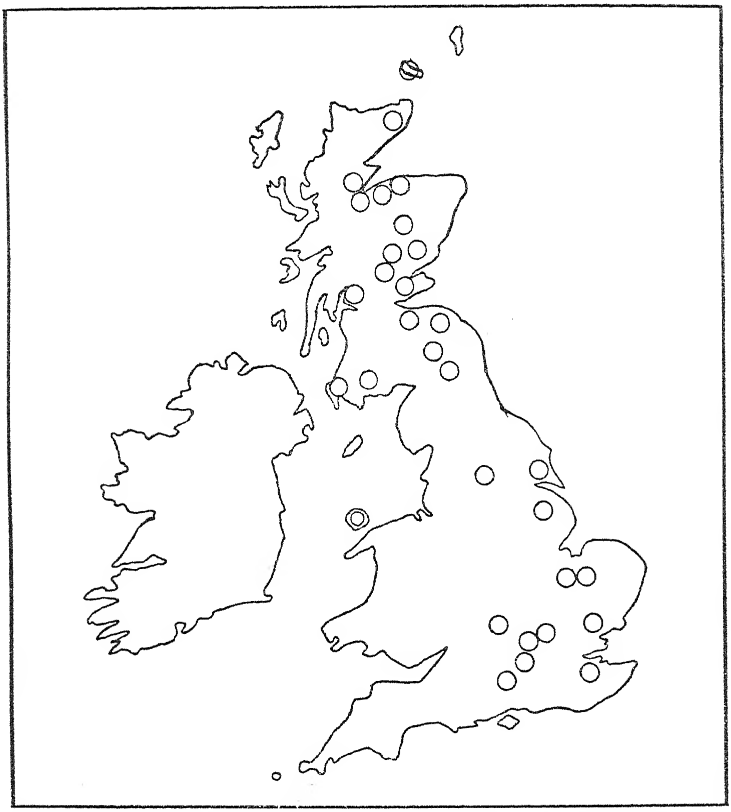
scents into water. In spring will fairly often rest on shore close to water, but is not otherwise much at home on land, though for short distances it walks with fair facility and comparatively horizontal carriage for a diving duck. Usually swims rather low with tail trailing. Mode of diving varies, probably with depth of water; at times a distinct jump, at others a more gentle submergence. Will occasionally "up-end" in shallow water like surface-feeders. Markedly gregarious; outside breeding-season in anything from small parties to flocks of many hundreds. Males form parties about beginning of June. Spends much of day resting on open water, feeding principally in morning and evening, though also to varying extent at night. Where liable to disturbance will "flight" in evening from larger to smaller waters. Likes to dive in shallow waters; J. M. Dewar found favourite depth about 3 ft., maximum 8 ft., and longest dive 25 secs., but G. C. S. Ingram and H. M. Salmon record average of 28 secs. for 18 dives in 13 ft. and a dive of 30 secs. is recorded (W. P. G. Taylor). Flocks usually show an excess of males, often very marked, ranging in England from less than 2 : 1 to, frequently, 8 or 9 to 1 and sometimes much more, while in some northern localities the excess may be habitually enormous, *e.g. c.* 50 : 1, Orkney (H. W. Robinson). *B.W.T.*

**Voice.**—Note of female, frequently heard in breeding-season, but little at other times, is harsh growling "kur-r-r" common to most female diving ducks; also a "conversational" "wuk-uk-uk." Note of male, chiefly confined to display, sounds like asthmatic groaning wheeze; also a soft low whistle (Millais). According to Millais male has also, whilst swimming, flying or excited, a hoarse "karr-karr-karr" not so deep as female's note, but this appears to require confirmation. *B.W.T.*

**Display and Posturing.**—Several males commonly display round one female, which in turn circles round a male dipping bill in water or stretching out neck low over surface, occasionally uttering call. Commonest display of male is blowing neck out with air with head raised horizontally and uttering wheezing note as air is released. Male sometimes lies flat on water with neck stretched out on surface to full extent and distended with air, and wheeze is also uttered in this position, while head is frequently turned on one side. Also throws head and neck suddenly back till occiput touches back and then jerks forward again. In excitement during display pupil contracts so much that whole eye seems to blaze a rich red (Millais: figd., vol. i, facing p. 8). Throw-back display chiefly in late Mar. or Apr. (Phillips). *F.C.R.J. & B.W.T.*

**Breeding.**—Nests by preference on ponds and lakes where thick growth of reeds, flags, rushes, etc., provides covert for nest: rarely in furze (Ireland). *Nest.*—Unlike that of most ducks, built in or very close to water; dead flags, broken reeds, etc., being used as with the Coot, to raise nest above water-level, and sheltered by reed-stems, rushes, etc. Down rather variable in amount, brown, with light centres, sprays rather large and generally much mixed with bits of dead reed, etc. For feathers see Plate 85A. *Eggs.*—6–11, but 13–15 recorded in England and 16, 18 on Continent: large, greenish-grey, sometimes with tinge of buff, broad oval or ovate, with blunt end, hardly any gloss. Average of 100 British eggs, 60·73×44. Max.: 66·5×42·7 and 62·5×46·5. Min.: 57·2×43 and 60·6×41·5 mm. Average weight (E. Rey), 6·3 grams (7·6 to 4·5 gr.). *Breeding-season.*—Begins about last week April, but most birds have full sets three weeks later. *Incubation.*—By duck alone, from last egg, rarely leaving the eggs. Period usually 24–26 days. *Fledging.*—Young leave nest day after hatching, tended by duck. Period 7–8 weeks. Single-brooded. *F.C.R.J.*

**Food.**—Mainly vegetable matter, roots, leaves, buds, etc., of aquatic plants such as *Potamogeton, Myriophyllum, Ceratophyllum, Lemna, Bidens, Glyceria, Polygonum, Chara,* and seeds of these as well as of reeds, rushes, and grasses (*Panicum*) : occasionally grain (oats). Animal matter includes small Crustacea : Mollusca (*Tellina,* also *Pisidium* and *Limnæa*) : Annelida (worms) : Insecta (Coleoptera, water-beetles, etc.) : Amphibia (small frogs, tadpoles) : occasionally small fish. *F.C.R.J.*



Map to show the Breeding Distribution in the British Isles of the Common Pochard.
The very local distribution of the Common Pochard as a breeding-bird is shown by the circles, which enclose the areas where it is known to breed regularly. No account has been taken of sporadic breeding.

**Distribution.**—*British Isles.*—Resident and winter-visitor. As resident has perhaps increased somewhat and has bred sporadically many parts, but little evidence of extension of regular settled breeding range in last 20 years or so, probably owing to restricted nature of habitat required. In *England* breeds very locally but regularly in Northumberland, Yorks, Lincs, Norfolk, Cambs, Essex, Kent, Herts, Bucks, Oxon, Berks, and Hants; also has bred sporadically or for a series of years but apparently does not now in Durham (not since 1933), Suffolk (not regularly), Hunts, Beds, Middlesex, Sussex, Surrey, Dorset, Somerset (1936), Notts, Leicester, Warwick (1866), Staffs, Salop, Cheshire (1932), S. Lancs and Cumberland (1927, 1928). In *Wales* breeds Anglesey and has bred Carmarthen and Merioneth. In *Scotland* breeds locally but regularly in Berwick, Roxburgh, Midlothian, Fife, Kinross, Perth, Angus, Aberdeen, Moray, Nairn, Inverness, E. Ross, Caithness, also in Kirkcudbright, Wigtown and Dumbarton, and in Orkneys. Has bred sporadically in Renfrew, Ayr, Selkirk, N. Argyll, W. Ross, Tiree, and probably O. Hebrides. In *Ireland* has bred Monaghan (1907) and Queen's co. (1931) and in Roscommon (1930–34), and stated to have bred Kerry, Tipperary, Westmeath, Meath, Sligo, Down, and Antrim. As winter-visitor widely distributed on inland waters (sometimes in very large flocks) and on coasts. *H.F.W.*

**Migrations.**—Some British breeding birds and young leave breeding areas end July and August and assemble in flocks on reservoirs and other large sheets of water (especially obvious in Thames valley) and move south to some extent, but no evidence of emigration over-sea. Winter-visitors from Continent (by recoveries of ringed birds, N. Germany and Finland) arrive E. coast early Sept. to mid-Nov., most coming in after mid-Oct. No evidence of southward passage beyond Brit. Is. Some evidence of spring-passage eastern counties England from mid-March, birds combining with winter-visitors and both leaving latter half March to end April. *N.F.T.*

**Distribution Abroad.**—Palæarctic region. Breeds in Europe north to France, Holland, Belgium, Denmark, central and S. Sweden, Germany, Gothland, Öland, Åland Is., Poland, Baltic states, Finland, and Russia (from Solovetski Is. and Olonetz to S. Perm Govts.): in Asia, from Kirghiz Steppes, Aralo-Caspian region, Amu-Darya, Turkestan, Semipalatinsk, Altai, and W. Siberia to N.W. Mongolia and apparently Kamtschatka. In south from S. Spain, S. France (not Switzerland), Algeria, Tunisia, E. Austria, Yugo-Slavia, Romania to Russia (Ekaterinoslav Govt. and Transcaucasia). Winters in S. Europe, Mediterranean Is., Egypt, Palestine, Iraq, Persia, Baluchistan, Afghanistan, N. India, N. Burma, China, and Japan. Occurs in Norway. Accidental in Azores, Canaries, Madeira, Iceland (?), Færoes, N. Sweden, N. Finland, also Pribilof and Commander Is. Replaced by allied species in N. America. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—*Head* and *neck* all round chestnut, *chin* with minute white spot; *upper-mantle, lower-neck* and *upper-breast* black, feathers of upper-breast when fresh edged white or rusty; (*upper-parts*) rest of mantle and scapulars finely vermiculated white or greyish-white and black-brown; lower scapulars mouse-grey more or less vermiculated white; back dusky-brown vermiculated white; rump and upper tail-coverts black; (*under-parts*) centre of breast white, feathers more or less vermiculated dusky; sides of body and flanks white finely vermiculated black-brown; lower-belly and vent white coarsely vermiculated black-brown; under tail-coverts black; axillaries and under wing-coverts white; *tail* deep mouse-grey; *primaries* mouse-grey, pale ash-brown on inner webs, shaded sepia towards tip and inner ones often faintly freckled white, 2nd, 3rd, and 4th with outer webs shaded sepia; *secondaries* light grey tipped and more or less freckled white, inner ones with outer web bordered by narrow black line, innermost as scapulars; *primary-coverts* dark sepia; *bastard-wing* dusky-brown, tips freckled white; rest of *wing-coverts* mouse-grey plentifully vermiculated white. *N.B.—Secondaries* and *wing-coverts* are more plentifully vermiculated in some than in others. This plumage is acquired by a moult of body-feathers and innermost secondaries Aug. to Nov.

ADULT MALE. ECLIPSE.—The body-feathers are first moulted followed by tail and wings July and Aug. Rather like adult winter female but upper-mantle not cinnamon-brown, rest of mantle more coarsely vermiculated; nape, cheeks, and sides of neck rich auburn; wing (if not flightless) as in winter-summer male. (*Upper-parts*) feathers of crown black-brown, tipped auburn; nape auburn; upper-mantle dark-grey, feathers more or less faintly freckled greyish-white and in some tips auburn or faintly tinged buff; mantle and scapulars coarsely vermiculated deep mouse-grey and greyish-white; rest of upper-parts as in winter-summer; (*sides of head* and *under-parts*) cheeks, sides of neck, chin, throat, and fore-neck auburn, feathers with ashy-white bases, imperfectly concealed on fore-neck and usually conspicuous on chin and throat; chin-spot if present ill-defined; feathers of upper-breast deep mouse-grey deepening to blackish-grey at tip and tipped white (or cinnamon-buff) and more or less speckled same at tip; feathers of sides of body and flanks drab or mouse-grey coarsely vermiculated greyish-white towards tip; rest of breast and belly as adult female but many feathers usually more or less vermiculated whitish towards tip (vermiculation of under-parts more pronounced in some than in others); lower-belly and vent as in winter-summer but intermixed with drab-brown feathers, speckled whitish at tip; short under tail-coverts black-brown tipped white and more or less freckled same, lower ones vermiculated ash-brown and white; innermost *secondaries* mouse-grey coarsely vermiculated greyish-white.

ADULT FEMALE. WINTER.—(*Upper-parts*) crown black-brown, feathers tipped cinnamon-brown; nape and upper-mantle cinnamon-brown, feathers of upper-mantle sometimes faintly vermiculated white; rest of mantle, scapulars, and back deep mouse-grey, coarsely vermiculated greyish-white; lower scapulars more or less uniform; rump and upper tail-coverts black or black-brown, sometimes faintly dusted with tiny white specks; (*sides of head*) lores, small patch under and streak behind eye greyish-white washed cinnamon-buff (in some these areas uniform with cheeks); cheeks, sides of neck and fore-neck dusky, feathers tipped cinnamon-brown and narrowly edged white when fresh; (*under-parts*) chin and throat white often faintly spotted dusky; feathers of upper-breast deep mouse-grey shading to cinnamon-brown at tips and broadly tipped white; feathers of sides of body and flanks mouse-grey with distal halves or tips vermiculated white; feathers of centre of breast and belly mouse-grey broadly tipped ash-white; feathers of rest of belly, vent and under tail-coverts deep mouse-grey or sooty-brown with narrower white tips, in some vermiculated white; lower under tail-coverts greyish-white vermiculated dusky; axillaries and under wing-coverts as male; *tail* and *wing* as male, but *secondaries* without frecklings and more narrowly tipped white, innermost mouse-grey or warm sepia, in some outer web vermiculated whitish; *wing-coverts* deep mouse-grey, tips speckled white. This plumage is acquired by complete moult July to Nov.

ADULT FEMALE. SUMMER.[1]—The body-feathers, tail, sometimes some innermost secondaries are moulted Feb. to May, but not wings. Coloration as winter but *lower-mantle* and *scapulars* dark mahogany-brown, feathers tipped buff-brown, many feathers vermiculated ashy-white at tip, *mantle* and *scapulars* much darker than in winter plumage and much less vermiculated; *under-parts* as in winter but sides of body and flanks rich cinnamon-brown with buff-brown tips, some feathers partly edged white or indistinctly vermiculated greyish-white at tip. *Nest-down* is acquired in spring.

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[1] In the genus *Aythya* the summer plumage of the adult female is duller than that acquired in autumn and is possibly the eclipse plumage assumed at an earlier date than in other ducks.

NESTLING.—Down of crown, nape and upper-parts black-brown with an olivaceous tinge; bar across wing, irregular patch on side of back below wing, and small patch on either side of rump greenish-yellow; eye-stripe and cheeks pale yellow or greenish-yellow; irregular brown streak, ill-defined in some, from below eye to nape; sides of body and usually sides of vent and back of thighs black-brown tinged olivaceous; remaining under-parts greenish-yellow (in some tinged greyish), paler on vent and uropygial tuft.

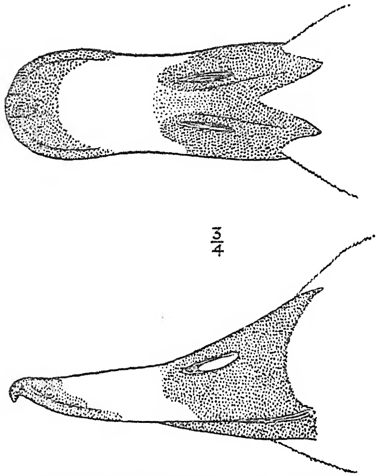
JUVENILE. MALE.—Like adult winter female but distinguished by less vermiculated upper-parts and characteristically mottled appearance of under-parts. (*Upper-parts*) head, neck and upper-mantle as in adult female, but not such a rich cinnamon-brown; cheeks and sides of neck paler than in adult female; white patch under eye but no white streak behind eye; scapulars sepia tipped cinnamon-brown, intermixed with hair-brown or mouse-grey feathers, more or less vermiculated greyish-white; remaining upper-parts as in adult winter female, but rump and upper tail-coverts without white frecklings; (*under-parts*) feathers of upper-breast with deep mouse-grey bases, and tipped white or buff; sides of body and flanks deep mouse-grey (flank-feathers with ill-defined vermiculations of light drab or white) tipped buff-brown or white; rest of under-parts deep mouse-grey or sooty-brown, feathers with narrow white or buff-brown tips, which do not obscure grey bases as in adult winter female and thus under-parts have a characteristically barred or mottled appearance; *tail* as in male but with square abraded tips; *wing* much as adult female (sometimes with less freckling) and differing from adult male in having *secondaries* if vermiculated at all, only towards tip, inner ones (with dark line bordering outer web) with no vermiculations; *innermost secondaries* and *coverts* dark hair-brown more or less freckled white; rest of *wing-coverts* deep mouse-grey speckled cream towards tip, not mouse-grey vermiculated white as in adult male. FEMALE.—As male, but *mantle*, *scapulars* and *flanks* without vermiculations, feathers of mantle and scapulars tipped buff-brown, mantle more or less freckled greyish but less grey than juvenile male; *wing* as adult female but *secondaries* including innermost and *wing-coverts* without frecklings.

FIRST WINTER AND SUMMER. MALE.—As adult but in many juvenile body-feathers are retained, especially those of breast, belly and vent; easily distinguished from adult by juvenile wing. Many body-feathers, tail and occasionally some innermost secondaries and coverts are moulted Aug. to Feb. but not rest of wings. Some are in full winter-summer plumage by end Oct., while others with juvenile breast and belly occur end Feb.

FIRST WINTER. FEMALE.—Coloration as adult winter female and only to be distinguished by retained juvenile wing-coverts. Many body-feathers, usually some or all tail-feathers, occasionally some innermost secondaries are moulted from Aug. onwards, some have moulted into first winter by Oct.; while others with juvenile breast, belly and vent occur in Jan. FIRST SUMMER.—Forward females appear to have a more or less complete body-moult in April and assume a summer plumage and nest-down like that of adult; less forward birds probably do not acquire a complete 1st winter plumage but commence instead to get some feathers of summer dress which may or may not be completely acquired (not much material examined).

FIRST ECLIPSE. MALE.—As in adult eclipse and only to be distinguished if any juvenile body-feathers are retained and by juvenile wing if not moulted.

MEASUREMENTS AND STRUCTURE.—♂ wing 211–220 mm., tail 50–55, tarsus 35–38, bill from feathers 45–49 (12 measured). ♀ wing 201–212, bill 43–47. Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd equal or slightly shorter, 4th 5–8 mm. shorter, 5th 14–21 shorter, 6th 27–36 shorter; 2nd emarginated inner web, 3rd outer web. Innermost secondaries elongated with slightly rounded tips, longest between 4th and 5th or 5th and 6th primaries. Scapulars with somewhat rounded tips. Tail short, much rounded, 14 stiffish feathers. Bill about as long as head, higher than broad at base, slightly wider towards tip, frontal angles acutely pointed, culmen broad, rather concave in front of nostrils, convex at tip, nail small and rounded at end; lamellæ of upper mandible concealed.



Bill of an adult male of the Common Pochard (*Aythya ferina*) from above and side.

SOFT PARTS.—Bill (ad. ♂) base and tip blackish-slate, middle portion light grey-blue, (ad. ♀) duller, (ad. ♀ summer) olive slate-grey, tip blackish-olive, lower mandible blue-grey tinged pink; legs and feet (ad. ♂) dull grey, webs blackish-slate, (ad. ♀) very light greenish-grey, joints and webs slate; iris (ad. ♂) reddish-yellow, in spring brilliant red, (ad. ♀) brown, in summer reddish hazel-brown, (juv. ♂) yellowish-brown becoming reddish later, juv. (♀) dark brown.

[*A.C.M.* revised by *H.F.W.*]

**Characters and allied species.**—Common Pochard is easily distinguished from all its British congeners in all plumages by grey speculum and wing-coverts. *A. valisineria* (Canvas-back) (N. America) has top of head and cheeks brown, upper-parts paler and a much longer bill than *A. ferina*, but is otherwise very similar and might perhaps be regarded as conspecific. *A. americana* (Redhead) (N. America) differs from *A. ferina* in structure of bill, nail of which is large and forms a marked hook at tip and frontal angles of upper mandible are flatter and not so ridged as in *A. ferina*, and the two birds cannot be regarded as conspecific as was stated in *A Practical Handbook*. *H.F.W.*

*PLATES 87 and 91.*

### 329. THE FERRUGINOUS DUCK—Aythya nyroca nyroca (Güld.)

ANAS NYROCA Güldenstädt, Nov. Comm. Acad. Sc. Petrop., xiv, i, p. 403 (1770—S. Russia).
*Fuligula nyroca* (Güldenstädt), Yarrell, iv, p. 418: Saunders, p. 445.
*Nyroca nyroca nyroca* (Güld.), Pract. Handb., ii, p. 318.

**Habitat.**—Though occurring on a wide variety of fresh waters its typical haunts are secluded pools and lagoons, often in swamps and marshes, with abundant cover of reeds, etc., and with growth of submerged and floating vegetation. Over much of range is a strictly fresh-water species, but in some areas, such as India and S.E. Europe, occurs regularly and abundantly on sea in winter. *B.W.T.*

**Field-characters and General Habits.**—At close quarters *general rich chestnut colouring with darker brown back and, in male, white eye* are distinctive enough, but at longer range colouring, especially in case of duller, brown-eyed female, often does not look very different from female Tufted Duck, and *conspicuous* *white under tail-coverts* are really best character on water at any distance. White wing-mark is often hidden in swimming bird, but when wings are flapped or in flight is extremely conspicuous, forming *broad roughly crescentic white band on flight-feathers*. Silky white under-parts shading into grey on abdomen are also evident in flight, though duller in female. Male in eclipse and juveniles are much like females. The young birds, however, have not the pure white under tail-coverts and are not very unlike female Pochard, though back is darker and rest more rufous ; white wing-bar is here best distinction. Bill and legs of adult blackish. Total length *c.* 16 ins. ; body *c.* 10½ ins.

Though found in numbers on quite open water at times is generally retiring and somewhat secretive rather than shy, preferring vicinity of cover and often skulking amongst reeds, etc., but most sportsmen with experience of the species consider it rather stupid and not easily alarmed. Flight and general behaviour much as other diving ducks (*cf.* Pochard) ; most observers find it inclined to fly low, but H. Whistler states that when once under way it flies fast and high. An expert diver, but prefers shallow water (*c.* 3–4 ft.) ; Millais thought they submerged for a shorter time than Pochard, but others find they do so for a long time and A. O. Hume estimates as much as 40–50 secs. Will frequently rather dive than fly to escape danger (H. Wormald). Will also " up-end " or merely reach down for food in shallows. Appears to be mainly a day-feeder and not as given to flighting as many diving ducks. Though often occurring in immense numbers in winter-quarters, rarely if ever forms close flocks of any considerable size, dispersing in small groups and parties. Does not mix much with other species. *B.W.T.*

**Voice.**—Note of female is harsh sound much like Pochard's, but less loud. That of male (chiefly breeding-season, but occasionally autumn and winter) is a low, rather grating wheeze (H. Wormald) or wheezing groan (Millais). *B.W.T.*

**Display and Posturing.**—Displaying male swims with head high and bill at angle of *c.* 75° and when close to female throws head up and back very quickly, but not so far back as Pochard, bill being never more than perpendicular. Also stretches out neck, much distended with air on surface of water, then sometimes raising it to full extent, uttering wheezy note ; raises head and neck slightly 2–3 times in quick succession, swelling out neck and wheezing at same time, or moves distended neck backwards and forwards. Female silent during display (Millais, G. Legge, H. Wormald). *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds not only in reed-beds on lakes, but also among tangle of aquatic vegetation on edge of small pools on plains : generally close to water and in wet places. *Nest.*—Well concealed among reeds or sedge and other water-plants, sometimes in middle of big grass tussock, with substantial cup of dead vegetation and lining of down and feathers. Down described as much like that of Pochard, brownish-grey, but light centres smaller and tips of sprays lighter. Feathers (see Plate 91), some have yellowish-brown tips. *Eggs.*—Usually 7–11, but 12–14, once 20 recorded : higher numbers probably due to two females : pale buff or yellowish-grey, sometimes with a brownish tinge : blunt ovate. Average of 100 eggs (36 by H. Goebel, 21 E. Rey), 52·29×38·22. Max. : 62·8×36 and 57×43. Min. : 48·4×37 and 48·9×33·7 mm. Average weight (Rey), 4·13 grams (5·1–3·9 gr.). *Breeding-season.*

—In S. Spain from about beginning of May: generally a week or so later in middle Europe. *Incubation.*—By duck alone: drake usually not far off. Period 25–27 days. *Fledging.*—Young tended by duck. Single-brooded. *F.C.R.J.*

**Food.**—Varied, vegetable matter preponderating and including remains of *Polygonum*, *Potamogeton*, *Nymphæa alba*, *Lemna*, and seeds of *Carex*. Animal matter includes small fish and spawn, sometimes in numbers: small frogs and spawn, worms, Mollusca (water-snails), fresh-water Crustacea and Insects (Odonata and larvæ (*Libellula*, *Agrion*, etc.), Hemiptera (*Tropicoris*), Trichoptera (larvæ of *Phryganeidæ*), Coleoptera (*Sitona*, etc.) and Diptera). *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. *England and Wales.*—Some sixty recorded from Norfolk, over twenty from Suffolk, and has occurred Cambs, Notts, Yorks, Northumberland (one), Lancs (one), Oxon (four), Essex (one), Middlesex (three), Kent (four or five), Surrey (one or two), Sussex (nine), Hants (a few), Dorset (one), Somerset (two or three), Devon (three), Cornwall (one), Glamorgan (one), Carmarthen (one or two), Pembroke (two), Brecon (three), Radnor (one), Montgomery (seven), Carnarvon (one), Merioneth (one), Flint (? one), and Is. of Man (three or four). *Scotland.*—One or two Firth of Forth, two on Tay, Roxburgh (two), Midlothian (one), and Aberdeen (one). *Ireland.*—Eight or nine. *H.F.W.*

**Distribution Abroad.**—S. Palæarctic region only. In Europe north to E. France (formerly or rarely nesting Holland and Belgium), Germany, Poland, Czecho-Slovakia, Hungary, Romania, and Russia north to 55° and south to Perm Govt. In Asia from Kirghiz Steppes, S.W. Siberia, Semipalatinsk, and Zaissan to S. Tibet. In S. Europe to Mediterranean coast and Black Sea: also Marocco, Algeria, N. Syria, Transcaucasia, N. Persia, Turkestan to Kashmir. Replaced by allied race (*A. n. baeri*) in Siberia east of Yenisei to Ussuria and Manchuria. Winters south to Mediterranean and islands, N. Africa to Egypt, Iraq, S. Persia, Baluchistan, N. India, Burma: also tropical Africa (Nigeria to Abyssinia). Casual Denmark, Sweden, Finland, N. Russia, Baltic states, ? Iceland, Canaries, and Japan. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—*Head* and *neck* all round bay; chin with a white spot (sometimes immediately below chin a dusky-brown patch); dusky-brown or black collar encircles lower-neck and nape, some feathers tipped bay; (*upper-parts*) sides of upper-mantle bay; remaining upper-parts black or black-brown glossed dull green, feathers of mantle and in some scapulars with faint bay frecklings, those of upper-mantle sometimes tipped bay; (*under-parts*) upper and sides of breast bay; sides of belly and lower flanks cinnamon-drab, feathers broadly tipped auburn and intermixed with auburn feathers; centre of breast white, feathers vermiculated ashy towards base; feathers of belly and vent deep ash-brown with buff or white tips and more or less freckled same towards tip; under tail-coverts white; axillaries and under wing-coverts white with a few dusky markings; *tail-feathers* black-brown, outer pair in some freckled white at edge; *primaries* dusky-brown, tips black-brown glossed dull green, inner webs much paler and shading to pure white, inner feathers more or less white on both webs; *secondaries* white, with broad black-brown tips glossed olive-green, which on inner ones are narrowly edged white, one next innermost secondaries with inner web more or less dusky-brown; innermost secondaries black-brown glossed olive-green; all *primary-coverts* and *bastard-wing* black-brown, slightly glossed dull green; *greater coverts* black-brown glossed olive-green; *median* and *lesser coverts* olive-brown. *N.B.*—Owing to extensive abrasion of white tips of feathers in some, centre of breast in late summer appears more or less vermiculated ash-brown. Hardly any material in moult examined.

ADULT MALE. ECLIPSE.—Resembles adult female, but upper-mantle apparently lighter brown; sides of face and neck, chin and throat paler. The body-plumage (tail and innermost secondaries ?) is first moulted followed by wings and tail end May to Aug. (*Upper-parts*) fore-head, crown and top of nape as in winter-summer; nape and new feathers of upper-mantle hair-brown, narrowly edged russet; new scapulars black-brown or sepia tinged olive; *cheeks* and *sides of neck* russet; (*under-parts*) chin and throat same, but feathers with ill-concealed ash-white bases; lower-neck with russet-brown semicircular collar, feathers faintly tipped white; feathers of upper-breast bay with imperfectly concealed drab-brown bases and broad white tips tinged russet; sides of body and flanks as adult female; rest of under-parts as winter-summer male; *tail* in full moult and both *wings* short and in quill in one specimen examined.

ADULT FEMALE. WINTER.—(*Upper-parts*) crown bay; nape, mantle and scapulars black-brown or sepia tinged olive, feathers mostly edged and slightly freckled russet; back, rump and upper tail-coverts as male; (*sides of head* and *under-parts*) cheeks and sides of neck auburn shading to russet on throat and fore-neck; chin usually with a white spot; upper-breast brown, feathers fringed deep russet or white tinged russet (in some tipped bay); flanks, sides of body and sides of vent brown, feathers shaded and edged russet or buff-brown; rest of breast white, some feathers with imperfectly concealed drab bases; remaining under-parts, *tail* and *wings* as in male. SUMMER.—No spring material examined. Colour of *head* and *neck* appears to be less rich, *upper-parts* with no frecklings and *throat* more or less intermixed with white, which may be due to abrasion.

NESTLING.—Crown, nape, mantle, back, uropygial tuft and sides of body warm sepia, down with golden-brown tips; wing-bar, patch on either side of mantle and at base of uropygial tuft pale yellow; eye-stripe, cheeks and sides of neck, chin, throat and upper-breast pale yellow; belly pale yellow intermixed with warm sepia; vent and thigh all round more or less warm sepia.

JUVENILE. MALE AND FEMALE.—Like adult winter female but distinguished by mottled appearance of under-parts. *Upper-parts* as in adult winter female but feathers of crown black-brown with bay tips; nape ash-brown or drab-brown; (*sides of head* and *under-parts*) cheeks, sides of neck, chin, throat and fore-neck dusky-brown, feathers tipped auburn (in some white chin-spot absent and chin and throat ashy-white, feathers tipped pale auburn); sides of body, flanks, and vent as in adult female; under tail-coverts white irregularly marked brown; rest of under-parts drab, feathers edged white or pink-buff (some feathers of breast tipped russet) giving under-parts a mottled appearance; *tail* and *wing* as adult female.

FIRST WINTER AND SUMMER. MALE.—As adult winter-summer male but *median coverts* generally browner and more worn. The juvenile body-feathers, tail and innermost secondaries and coverts are moulted Oct. to Feb. but not rest of wings; sometimes some juvenile body-feathers are retained. FEMALE.—Probably as adult female and moult as in male but no material examined.

MEASUREMENTS AND STRUCTURE.—♂ wing 174–192 mm., tail 48–58, tarsus 29–31, bill from feathers 40–43 (12 measured). ♀ wing 176–185, bill 36–40. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd and 3rd equal and longest (3rd sometimes slightly shorter than 2nd), 4th 3–8 mm. shorter, 5th 14–16 shorter, 6th 22–28 shorter. Bill shorter than head, slightly broader at tip than at base, culmen less abruptly concave. Other structure as in Common Pochard.

SOFT PARTS.—Bill (ad. ♂) greenish-black, greyer at tip and along cutting edge, under mandible horn-brown, (ad. ♀) blackish-lead, greyer at tip and along cutting edge, under mandible as in male, (juv. ♂) slate-blue-black lighter towards nail; legs and feet (ad. ♂) black marked greenish-yellow, (ad. ♀) greenish-grey, webs black, (juv. ♂) lead-blue with greenish shade; iris (ad. ♂) white, (ad. ♀) brown, (juv. ♂) dark brown becoming pearl-grey about March.

[*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Adult males are easily distinguished from other British members of genus by bay head, neck and upper-breast, adult females by bay crown, cheeks and sides of neck, and juveniles by having feathers of crown tipped bay and flank-feathers tipped russet. In *A. n. baeri* (E. Asia) adult males have head and neck black glossed green, adult females black-brown glossed dull green. [*A.C.M.*]

[NOTE.—A male example of BAER'S DUCK, *Aythya nyroca baeri* (*Anas* [*Fuligula*] *Baeri* Radde, Reise S. v. O. Sibirien, ii, p. 376, pl. 15, 1863—S.E. Siberia), was obtained on Tring Reservoirs (Herts) on Nov. 5, 1901 (N. C. Rothschild, *Bull. B.O.C.*, xii, p. 25), and another on the Trent (Notts) about mid-April, 1911 (J. Whitaker, *Brit. B.*, vii, p. 268). These may have been wild birds, but since "water-fowl" are kept in semi-captivity sometimes without even being properly identified, it seems inadvisable to admit this duck to the list. It breeds in E. Siberia and is found on passage and in winter in Japan and China and irregularly in Burma and India.]

*PLATES 80, 87a, and 88.*

## 330. THE TUFTED DUCK—Aythya fuligula (L.)

ANAS FULIGULA Linnæus, Syst. Nat., ed. x, i, p. 128 (1758—Europe. Restricted typical locality: Sweden).
*Fuligula cristata* (Leach), Yarrell, iv, p. 430; Saunders, p. 447.
*Nyroca fuligula* (L.), Pract. Handb., ii, p. 321.

**Habitat.**—Frequents lakes, lochs, meres, and other fresh waters of medium to large size, preferably with fringing reeds or other cover or secluded islands, though also regular in winter on reservoirs, etc., with no cover at all. In breeding-season prefers the more secluded waters, nearly always with some cover. When undisturbed will frequent lakes and ponds in town parks in some numbers in winter and even breeds regularly on some. Rarely on sea, except as straggler on migration or occasionally during frost, and hardly ever far from land. *B.W.T.*

**Field-characters and General Habits.**—*Bold contrast of pure white flanks with black of rest of plumage* is distinctive of male, whose pendent *occipital tuft* gives characteristic appearance at close range, but is not always obvious at distance unless blown clear of bird's head by wind. Female and juvenile are very dark brown, former showing some whitish on sides above water-line in winter, but little or none in breeding-season. There is usually a little whitish at base of bill, and sometimes in adult females and juvenile males this is fairly extensive and conspicuous, giving rise to confusion with female Scaup, but never such a broad or sharply defined band as in adult of that species. Distinction of some from immature Scaup (see p. 302) may be difficult, but crest, though much shorter than in adult drake, is usually perceptible. In flight both sexes look black or nearly so with white belly, except in breeding female, and show *broad, white wing-bar*, which, however, becomes dingier and less distinct on primaries; also narrow white sub-marginal band along whole inner border of wing. Full plumage of male from about Nov.

(some early Oct.) to about end June; eclipse complete from early Aug. to about end Sept. Male in eclipse resembles female, but dark parts blacker and under-parts whiter. Young males are darker than young females and show signs of mature plumage in Nov. or earlier, change being generally complete by beginning of Mar. (Millais) or in some even by end of year. Total length *c.* 17 ins.; body *c.* 11 ins.

Readily becomes tame where protected. Flight, gait, diving and general habits very much as Pochard (*q.v.*). In Brit. Is. seen chiefly in small parties up to 25 or so, though large flocks occur in some localities and regularly attain huge dimensions abroad (*e.g.* India). Favourite depth for diving appears to be slightly greater than in case of Pochard, but still shallow—*viz.* 2–6 feet, greatest depth recorded by J. M. Dewar being 16 ft. and longest submergence 40 secs.; G. C. S. Ingram and H. M. Salmon, however, record up to 21 ft. (though average of 4 dives at this depth was only 28 secs.), and Millais gives 50 secs. as typical. Will sometimes turn over stones on bottom. When playing, according to Phillips, but not when feeding, wings may be half opened under water. In many districts there is no marked or constant preponderance of either sex, numbers generally varying from equality to about 3 : 1 either way, but more often in favour of females and young; in other, widely separated, areas (*e.g.* Cheshire, Herts: C. Oldham) a very marked excess of adult males is usual. No regular excess of males recorded in north as in several other species, females much outnumbering males in Orkney according to H. W. Robinson. *B.W.T.*

**Voice.**—Note of female is usual harsh, growling "kur-r-r, kur-r-r" common to females of most diving ducks. Male's note in breeding-season is pleasing sound difficult to express, described as a low gentle whistle something like the word "hoi" (Millais) or a soft, liquid, several-syllabled utterance, rarely penetrating to any distance (S. E. Brock), uttered with quivering of whole body. *B.W.T.*

**Display and Posturing.**—Display is not demonstrative and often consists of no more than raising head with bill inclined upwards at angle of *c.* 45° and lowering again after some seconds, with accompanying whistling note. Also throws back head precisely as in Ferruginous Duck (*q.v.*) and without vocal accompaniment, but this seems less common (Millais, G. Lascelles, H. Wormald, S. E. Brock). Drake (and more exceptionally duck) also occasionally raises fore-part of body in somewhat slow and deliberate manner as though about to flap wings, head and neck being extended perpendicularly upwards (Brock). Female dips bill in water and utters call (Millais). Display figd. Millais, vol. i, facing p. 140. Pursuit-flights on breeding-ground are common, usually consisting according to Brock of two drakes and a duck, but not as a rule lasting long.[1] *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds on islands in large lakes: also on quite small pools, mill-dams, etc.: sometimes considerable numbers may be found nesting together, but isolated pairs also met with. *Nest.*—Generally within a few yards of water and often quite close to it: will nest under shelter of bushes or amongst flags or other cover and also in tussocks of rushes or grass, or on grassy slopes in open. Has been known to nest on wall in island. Hollow lined with grasses or rushes and well supplied with down, which is very dark, sooty, light centres inconspicuous. Feathers dirty white and small (see Plate 87A). *Eggs.*—From 6–7 to 14, but every number may be found up to 18, and as several ducks will lay together, 20–28 eggs may be seen piled up in a heap. They are large for the bird, sometimes elongated, blunted; greenish-grey in colour, not glossy. Average of 100 British eggs, 57·78×40·52. Max.: 62·2×38·3 and 56·7×43. Min.: 53·7×41·1 and 58·6×37·7 mm. Average weight, 4·72 grams (6·4 to 3·9 gr., E. Rey). *Breeding-season.*—A late nester: clutches seldom before mid-May and often not till June. *Incubation.*—By duck only, begins with last egg. Period rather variable; usually 23–25, but sometimes a day or two longer. *Fledging.*—Young tended by duck, which at first brings up food by diving, but young learn to dive in a few hours (S. E. Brock). Able to fly at 6 weeks (Brock). Single-brooded. *F.C.R.J.*

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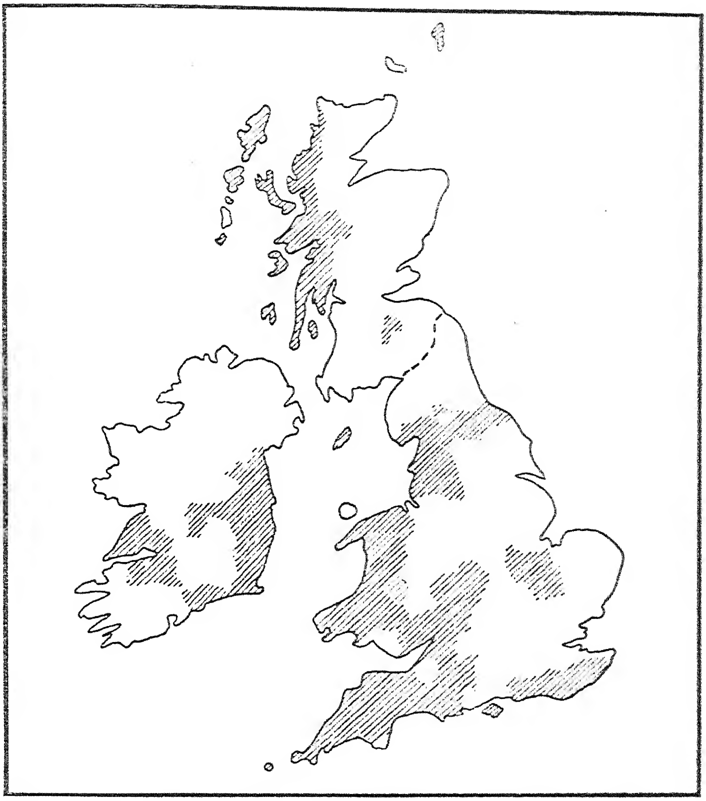
[1] According to Brock's account the flight is initiated by a male intruding in an aggressive manner on a mated pair and chasing the duck, her mate following half-heartedly, and the intruder usually abandoning the flight after a short distance. This recalls the territorial chases (as opposed to true pursuit-flights) of the Mallard (see footnote, p. 234), but these result from the intrusion of a *pair* on occupied territory and the "*owner*" drake chasing the intruding *duck*. If correctly observed this case seems to add a third type of pursuit to the two defined by Geyr in the Mallard.

**Food.**—Varied, animal and vegetable but chiefly the former. Animal matter includes occasional small fish and spawn, as well as frog (*Rana esculenta*), also tadpoles and spawn: Mollusca, both fresh- and salt-water (*Littorina, Rissoa, Bithynia, Valvata, Limnæa, Mytilus, Pisidium,* etc.): large numbers of insects (Ephemeroptera (larvæ of *Ephemeridæ*), Hemiptera (*Notonecta,* etc.), Trichoptera (larvæ of *Phryganeidæ*), Coleoptera (water-beetles) and Diptera). Vegetable matter includes grasses, duckweed (*Lemna*), portions of many water-plants (*Polygonum, Potamogeton, Rumex,* etc.), and berries of hawthorn (*Cratægus*). *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident, passage-migrant and winter-visitor. During last forty or fifty years has greatly increased and extended its range as a breeding bird in all parts, but nature of habitat makes it local. In *England* breeds regularly all E. coastal counties and Beds, Herts, Middlesex, Surrey, Berks, Bucks and Oxon, also Hants, Wilts, Somerset, S. Devon, Hereford, Salop, Staffs, Cheshire, S. Lancs, Derby, Notts, Leicester and Northants, and Westmorland and Cumberland. Has bred but not regularly N. Lancs, Worcester, Warwick, Cambridge, Hunts, Sussex and Dorset. In *Wales* it breeds in Glamorgan and Anglesey and has bred and probably does so in Radnor and Merioneth. In *Scotland* now breeds in all counties *except* Peebles in south, and from Argyll northwards on W. side; also breeds in Orkneys and S. Uist (since 1903). Has bred in N. Uist and Benbecula and in some Inner Hebrides. In *Ireland* now known to breed in every county except on southern part of E. side (Louth, Meath, Dublin, Kildare, Wicklow, Carlow, Wexford), Waterford, Limerick and Clare in south and west, and King's in centre. In winter more numerous and more widely dispersed. *H.F.W.*

**Migrations.**—British breeding birds to a considerable degree resident, but move south to some extent and assemble on reservoirs and other large sheets of water from mid-July and August onwards. No evidence of passage beyond Brit. Is. Winter-visitors from Continent (by recoveries of ringed birds from Iceland, N. Russia, Finland, Denmark, and N. France) arrive N. and E. coasts mid-Sept. to mid-Nov. By recoveries many of those of more northern origin pass to northern counties and Ireland and some migrants to England afterwards travel on to Ireland. Some return to same winter-quarters in successive years. No evidence of passage beyond Brit. Is. Return passage in spring end Feb. to mid-May. A young bird ringed Northumberland recovered as abmigrant (see p. 235) N. Finland June two years later. *N.F.T.*



Map to show Breeding Areas in the British Isles of the Tufted Duck.
In the shaded areas the bird is *not* known to breed regularly. In the unshaded areas it is widely but very unevenly and locally distributed as a regular breeding bird. No account has been taken of sporadic breeding.

**Distribution Abroad.**—Palæarctic region, but not in Mediterranean sub-region. Breeds north to Iceland, probably Bear Is., Norway to 69½°, Sweden, Finland, Russia (Archangel Govt. to N. Urals and Perm Govt.): also in Siberia east to Ussuria, Sakhalin, and Japan: probably Commander Is. In south to Holland (rare), Germany, Czecho-Slovakia, Austria ? Albania, Yugo-Slavia, Romania, Russia (Kiev, Ekaterinoslav, Don Cossacks, Astrakhan Govt. to Transcaucasia), Cyprus (rare), Syria, Aralo-Caspian region, Pamirs, Altai, and N.W. Mongolia. Winters south to coasts of Mediterranean and Black Seas and islands, N. and tropical Africa, S. Asia from Arabia to India, Burma and S. China, Malay Archipelago. Casual Greenland, Færoes, Kolguev, Madeira, Liberia, and Pribilof Is. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head, neck* and *upper-parts*) crest, head and neck all round and rest of upper-parts black (chin sometimes white), crown, crest, cheeks and sides of neck glossed magenta or violet-purple, in some lights cheeks and sides of neck glossed dark green, rest of upper-parts glossed dull green; mantle and scapulars minutely freckled or dusted cream; (*under-parts*) upper-breast black, feathers when fresh tipped white; breast and belly white; sides of body and flanks white, sometimes faintly freckled dusky; lower-belly white, more or less vermiculated dusky; vent and under tail-coverts black; axillaries white usually freckled dusky and under wing-coverts mostly white; *tail-feathers* black-brown; *primaries* dusky-brown with black-brown tips, inner webs paler, inner ones with outer webs ashy-white; *secondaries* white, broadly tipped black-brown, inner ones with a dusky line bordering outer web, one next innermost with inner web dusky-brown, innermost black glossed dull green; *wing-coverts* black or black-brown glossed dull green, *median* and *lesser coverts* minutely freckled cream. This plumage is acquired by a body-moult Aug. to Dec.

ADULT MALE. ECLIPSE.—The body-feathers (? innermost secondaries) are first moulted followed by tail and wings July and Aug. *Head* and *neck* all round brown-black, feathers of chin, throat and fore-neck with brownish-white bases more or less exposed; black crest usually shed or much worn; (*upper-parts*) mantle and scapulars as in winter but duller black and with less green gloss, feathers of whole mantle dusted with tiny white specks; remaining upper-parts as in winter; (*under-parts*) upper-breast brown-black, feathers fringed white; sides of body and flanks pale drab, some feathers vermiculated greyish-white and intermixed with white feathers vermiculated drab; lower-belly and vent white, feathers more or less vermiculated dusky and intermixed with drab feathers more or less vermiculated whitish; under tail-coverts brown-black, some white vermiculated dusky; *tail* and *wing* as in winter. Crest is apparently shed only once and is renewed during post eclipse moult.

ADULT FEMALE. WINTER.—(*Upper-parts*) crown and crest black-brown (sometimes almost black), feathers edged cinnamon-brown; nape and upper-mantle sepia, feathers tipped cinnamon-brown; mantle and scapulars black-brown glossed dull green, feathers usually edged cinnamon-brown, lower-mantle and scapulars sparsely dusted white; back, rump and upper tail-coverts black glossed dull green; (*sides of head* and *under-parts*) cheeks, sides of neck, chin, throat and fore-neck warm sepia, many feathers with black tips and with ill-concealed brownish bases, in some (old females?) these parts almost black with purple gloss; feathers round base of upper mandible usually more or less white especially on lores, tiny white spot on chin in some; lower-neck and upper-breast sepia or black-brown, feathers broadly fringed yellowish-white or white, those bordering fore-neck often edged cinnamon-brown; sides of body and flanks drab, feathers fringed yellowish-white or white; centre of breast and belly white; vent ash-brown, feathers shaded white towards tip; under tail-coverts mostly white vermiculated and spotted dusky-brown; axillaries and under wing-coverts as in male; *tail* and *wing* as in male but black-brown tips to secondaries rather narrower. This plumage is acquired by complete moult July to Nov.

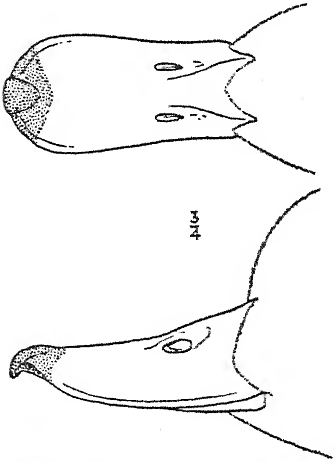
ADULT FEMALE. SUMMER.—The body-feathers, tail, innermost secondaries and coverts are moulted March to June. Coloration as winter but (*under-parts*) feathers of upper-breast edged golden cinnamon-brown; sides of body and flanks cinnamon-brown, feathers tipped buff-brown; rest of under-parts sepia, feathers of breast, belly and vent more or less tipped white or yellowish-white (in some intermixed with white feathers); lower under tail-coverts mottled white towards tip; *tail* and *wings* as winter. *N.B.*—*Under-parts* vary considerably individually from more or less white with a few sepia feathers to mostly sepia with a few white feathers. *Nest-down* is acquired in spring.

NESTLING.—Upper-parts darker than in Common Pochard and with no light patches (in some an indistinct brownish-yellow patch on side of back below wing); cheeks and sides of neck sooty-yellow, in some almost as dark as upper-parts, indistinct black-brown line from culmen around and beyond eye; ill-defined streak from lores to nape, connected in front of eye with first line; below this an ill-defined black-brown moustachial streak (these lines absent in some); chin and throat sooty-yellow; upper-breast sooty-brown, down with yellowish tips; centre of breast and belly yellowish-white or pale greenish-yellow, belly more or less suffused sooty-brown; uropygial tuft sooty-brown.

JUVENILE. MALE.—Very like adult winter female but with following differences: (*upper-parts*) feathers of upper-mantle with narrower cinnamon-brown edges; mantle and scapulars often more plentifully dusted white; varying amount of white on lores and chin, but apparently not on fore-head, in some white absent or merely indicated; (*sides of head* and *under-parts*) cheeks, sides of neck, chin, throat and fore-neck black-brown, feathers mostly with narrow yellowish tips; feathers of sides of body and flanks without vermiculations; feathers of belly and vent dusky-brown, narrowly edged white, producing a barred appearance; *tail* and *wing* as in adult male, but tips of tail-feathers usually square with bare shaft projecting. *N.B.*—One example had breast more or less narrowly streaked dusky. FEMALE.—As male but *upper-parts* more uniform brown, without or with only a few white dots; (*sides of head* and *under-parts*) cheeks, sides of neck, throat and fore-neck light sepia, feathers without black tips as in adult female; remaining under-parts and *tail* as male; *wing* as adult female.

FIRST WINTER AND SUMMER. MALE.—Advanced young males acquire most of the adult winter-summer plumage (though some juvenile feathers appear always to be retained on lower-belly) by Dec. Usually distinguishable from adult by retained juvenile feathers of *vent*, shorter *crest*, and feathers of *sides of body* and *flanks* finely vermiculated dusky-brown, more pronounced in some than in others. April birds occur which have only acquired a certain amount of winter-summer plumage and retain juvenile tail-feathers. Many juvenile body-feathers, usually tail, sometimes innermost secondaries are moulted Oct. to May but not rest of wings. FIRST ECLIPSE.—As adult eclipse and only to be distinguished by retained juvenile feathers on *lower-belly* and *vent*.

FIRST WINTER. FEMALE.—Like that of adult winter female and apparently only to be distinguished when some juvenile body-feathers are retained. Birds in 1st winter plumage with new tails, but with some juvenile feathers on under-parts occur in Jan., while others even in March are in worn juvenile plumage. Moult as in male. FIRST SUMMER.—Not examined.



Bill of an adult male of the Tufted Duck, (*Aythya fuligula*) from above and side.

MEASUREMENTS AND STRUCTURE.—♂ wing 198–208 mm., tail 49–57, tarsus 30–35, bill from feathers 38–42 (12 measured). ♀ wing 189–202, bill 38–41. Primaries: 1st narrow, pointed and more than half longest primary-covert, 2nd longest, 3rd equal or 3 mm. shorter, 4th 7–12 shorter, 5th 18–24 shorter, 6th 30–38 shorter. Bill a little shorter than head, about same height as breadth at base, wider towards tip, culmen less abruptly concave than in Common Pochard, nail small and decurved. Adult male with well-developed crest, 1–2 (occasionally 3) inches long, in female seldom exceeding 1 inch; young ♂ and ♀ with feathers of hinder-crown slightly elongated, forming a rudimentary crest. Other structure as in Common Pochard.

SOFT PARTS.—Bill (ad. ♂) slate-blue, nail black, usually a narrow white bar behind nail, (ad. ♀) slate-grey, nail black, (nestling) dark olive, under mandible yellowish, nail whitish; legs and feet (ad. ♂) lead-blue, (ad. ♀) light grey faintly tinged greenish, (nestling) olive-brown, pale yellowish-green along sides of tarsus, webs blackish; iris (ad.), golden-yellow, (nestling) brownish-grey, juv. ♂ brighter yellow than juv. ♀ (H. Wormald). [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Adult male distinguished by black head and crest, females and juveniles have upper-parts faintly dusted, never vermiculated white (distinction from Scaup), juvenile females can be confused with those juvenile female Scaup with no vermiculations on upper-parts but in Scaup upper-parts are lighter, white at base of bill more extensive and bill larger and broader. [*A.C.M.*]

*PLATES 81, 87a, and 88.*

## 331. THE SCAUP-DUCK—Aythya marila marila (L.)

ANAS MARILA Linnæus, Fauna Svecica, ed. ii, p. 39 (1761—Lapland).
*Fuligula marila* (Linnæus), Yarrell, iv, p. 423: Saunders, p. 449.
*Nyroca marila marila* (L.), Pract. Handb., ii, p. 325.

**Habitat.**—In breeding-season frequents lakes, lochs, and rivers of northern moorland, fell and tundra country, as well as locally in more cultivated districts. Outside breeding-season thoroughly marine, frequenting chiefly bays and mouths of estuaries; in some districts fresh-water lakes and lagoons close to shore are resorted to fairly freely, but is rare on reservoirs and other fresh waters far inland. *B.W.T.*

**Field-characters and General Habits.**—*Black head, shoulders and breast, vermiculated pale grey back, and white flanks* are distinctive of male; head glossed green, upper and under tail-coverts black. Wing of both sexes very like Tufted Duck. At long range, and in broken water, Tufted, Pochard and even Mallard drakes can all be confused with it, all four having dark head and breast and lighter body: black back of Tufted then appears little more than black line above flanks and may be far from obvious, while pure white flanks, which, apart from other differences, separate Scaup from both Pochard and Mallard, may be hidden by waves. The four species, however, are very distinct (*cf.* "Field-characters" under the several species), while habits also help (*e.g.* Mallard does not dive and Pochard is exceptional on sea) and possibility of confusion at distance has only to be recognized in order to be avoided. Moreover, except in case of isolated male Scaup, the white faces of accompanying females proclaim identity. This *broad white band round base of bill* is outstanding feature of dark brown duck and is always *broader and more sharply defined in adults than in female or immature Tufted.* On the other hand, immature Scaup have less white on face than adult female, so that identification of isolated individuals may be very troublesome and indeed only possible with very good and close view. Presence of more or less vermiculation on back, which increases as season advances, separates immature male Scaup from female Tufted at any age. In males of both species the white begins to be obscured by incursion of dark feathers quite early in autumn (*c.* mid-Oct.) and is mostly lost by Dec., but this change is the same in both and main difference at first is stronger vermiculation of Scaup and, usually, traces of crest in Tufted. But by mid-Oct. in some cases and by Nov. or Dec. at latest, further confusion is precluded by beginnings of mature plumage on back of Scaup, which thus becomes greyer and more strongly vermiculated, while Tufted, which has slight vermiculation in juvenile plumage, loses this and becomes blacker as it approaches maturity. Immature females are most difficult to separate and some perhaps impossible: some young female Scaup have some vermiculation, serving to separate them, but when this is absent there may be no other plumage difference than rather paler colour, since even white on face, though usually more extensive and in any case becoming so as new feathers come in, may be very little developed at first. At close range at which alone these differences are perceptible the slightly larger size, rather steeper fore-head and broader bill of Scaup may also be of some value. Scaup, moreover, is more robust, but better-proportioned bird than Tufted Duck, which usually looks rather large-headed and squat-bodied, though this difference is most noticeable in the drakes. Full plumage of male from about beginning of Nov. to July; eclipse complete from about Aug. to Sept. (Millais, Phillips); eclipse differs less from full plumage and is less like female than in most ducks, back, though duller, being still greyish and strongly vermiculated and only a little white being developed on face. Immature birds are described above; males acquire approximately adult (but dull) plumage from Feb. on, but individuals vary. Bill and legs of adult blue-grey. Total length *c.* 19 ins.; body *c.* 12½ ins.

A hardy and robust species little affected by cold and stormy weather. Flight and gait as Pochard (*q.v.*). Flocks usually fly in rather compact but irregular formations " or in one long unbroken line massed in several places " (Millais). At least in spring sometimes lands to rest on shore close to tide-edge. Thoroughly gregarious; flocks of many hundreds and sometimes thousands are of regular occurrence, but the birds tend to disperse in small groups or stretch out in long lines on water. Can feed in deeper (and rougher) water than preceding species; typical depths are given as 4 to 10 or 12 ft. (Phillips) and 12–18 ft. (C. E. Alford); greatest depth recorded by J. M. Dewar was 21 ft. and longest dive 49 secs.; 50–60 secs. is evidently exceptional (J. Cordeaux) and average is *c.* 25–30 secs. (Alford). When mussels, etc., are of fair size they are brought to surface before swallowing. Will also feed (regularly in some places) amongst pools and gutters on mud-flats. Feeding hours determined largely by tides where not interfered with, but becomes largely nocturnal where liable to disturbance. Odd non-breeding birds and even pairs are not rare in summer in localities where it does not nest, and late in season families tend to pack together like eiders and mergansers. Apparently a regular excess of adult males in north of Brit. Is. (*c.* 5 to 1, Orkney: H. W. Robinson); farther south (including Tay estuary: H. Boase) more often a preponderance of females and young. Phillips observes that many European writers note an excess of males, " and it does not seem certain that old males always winter farther north." *B.W.T.*

**Voice.**—Very silent in winter, but female has deep, harsh, " karr-karr-karr " and other softer notes used in courtship—*viz.* a crooning sort of note like " tuc-tuc-tŭrra-tuc " and a gentle call, " chup-chup " or " chup-chup-cherr-err " (Millais). Male has gentle cooing note, a short explosive " cu-*cōō* " (Phillips), and also a low whistle (Millais). *B.W.T.*

**Display and Posturing.**—Male approaches female with head and neck held up to fullest extent and bill elevated at angle of 50–60°. Actual display is quick throw-up of head and neck, which is greatly distended with air, but not carried back beyond the perpendicular; at summit of extension or after head is lowered cooing note is uttered. Female also lifts neck stiffly with crooning note or swims round dipping bill in water and making "chup-chup" call (see "Voice") (Millais, Phillips). Drawing back head and neck with quick jerk, but keeping head horizontal is also recorded for male (G. Legge). *F.C.R.J. & B.W.T.*

**Breeding.**—Where found commonly a sociable species, many breeding quite close together, usually on islands in lakes. *Nest.*—A hollow in ground or in tussock, at times in the open with no attempt at concealment, but sometimes sheltered by heather or grass; lined with nearest material, down and feathers. Down, dark, sooty-brown, light centres inconspicuous. For feathers see Plate 87A. *Eggs.*—6 or 7–11, 13 recorded: 19 and 22 due to more than one bird: blunt ovate or elliptical, greenish or olive-grey, similar to those of Pochard, but average narrower, no gloss. Average of 116 eggs (54 by H. Goebel and 25 by E. Rey), 63·18×43·53. Max.: 68·1×44·7 and 59×48. Min.: 54·5×41·5 and 66·3×40·7 mm. Average weight, 5·79 grams (7·2 to 4·9 gr., Rey). *Breeding-season.*—From end of May through June. *Incubation.*—By duck alone, seldom leaving nest. Period 27–28 days (in confinement, A. F. Moody and J. C. Laidlay). *Fledging.*—Tended by duck and led almost when dry to water: drake at times escorting the party (H. J. Pearson). Period 5–6 weeks (B. Hantzsch). Single-brooded. *F.C.R.J.*

**Food.**—Almost entirely animal matter, but in summer many buds and seeds of water-plants are eaten: *Zostera* has also been recorded and algæ are brought to the surface and eaten in winter. Animal matter chiefly Mollusca, especially young mussels (*Mytilus edulis*), but also *Nassa, Cerithium, Littorina, Rissoa ulvæ, Lacuna, Hydrobia, Bithynia, Limnæa, Nucula, Cardium, Pisidium,* etc.: Crustacea (small crabs, *Asellus, Gammarus, Idotea*): Insecta (Odonata (*Libellula*, etc.), Coleoptera (*Dytiscidæ*) and many small Diptera): Annelida (*Nereidæ*). Small fish (trout) occasionally taken. *F.C.R.J.*

**Distribution.**—*British Isles.*—Passage-migrant and winter-visitor and has bred. Bred Sutherland 1899, and in S. Uist (Outer Hebrides) 1897–9 (two pairs), 1900 (three pairs), probably also 1901 and certainly 1902 and 1906; also 1910 and 1913 (*cf. Brit. B.*, ii, pp. 85, 132, 209, 283, 416; vi, p. 368; vii, p. 147) but apparently not since. Also recorded breeding Orkneys (*B.O.U. List* (1915), p. 177) but no evidence or details available. Otherwise winter-visitor to all coasts and only occasionally on inland waters. *H.F.W.*

**Migrations.**—No information as to movements of British breeding birds. Winter-visitors (only source at present known from ringed birds—Iceland) arrive N. coasts second half Sept. to mid-Nov. (early dates, Aug. 1, W. Eagle Clarke; 3, 1895, Clyde, 1929, Ross; 5, 1927, Orkney; 27, 1924, Fife). Large majority of recoveries of ringed birds have been from Ireland (all provinces) but a few from Scotland (Orkney, Ross, Kirkcudbright, and Firth of Forth) and England (Durham, Lancs, and Cornwall). No evidence of passage beyond coasts of Brit. Is. Return migration mid-March to early May, but a number of instances of summering, June and August. *N.F.T.*

**Distribution Abroad.**—N. Holarctic region. Typical race breeds in Europe north to Iceland, Færoes, Norway to 69½° (but not in S.W.), Sweden, Finland, N. Russia (to Petchora and Kolguev). Also N. Siberia, east to Kamtschatka and Commander Is., but replaced in Bering Is. by allied race (*A. m. mariloides*), and in N. America from Aleutian Is. and Alaska to N. Dakota (*A. m. nearctica*). In south to Baltic Is. (Bornholm, Öland, Gothland, Oesel, Åland Is.); in Russia to Novgorod and Pskov Govts. Winters in Europe (but not in S.W.) to France, Corsica, Italy, Yugo-Slavia, Albania, and S. Russia (to Transcaucasia): in Asia to Asia Minor, Syria, Palestine, Sinai, Persian Gulf, and N. Persia: eastern birds in China, Japan, and Philippine Is.: America to southern states of U.S.A. Casual Greenland, Jan Mayen, Bear Is., S.W. Europe, N.W. Africa, Sardinia, Malta, and Egypt: occurs in India. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head, neck* and *upper-parts*) head and neck all round, upper-mantle and upper-breast black, crown, nape, cheeks and sides of neck glossed green, in some lights purple; feathers of upper-breast bordering white lower-breast, white with dusky-black vermiculations; mantle and scapulars white coarsely vermiculated black-brown; lower scapulars black-brown, some more or less vermiculated white; back black-brown vermiculated white; rump and upper tail-coverts black-brown glossed dull green; (*under-parts*) rest of breast and belly white (sides of belly and flanks white with a few faint wavy dusky lines); lower-belly and vent white more or less vermiculated dusky and black-brown; under tail-coverts black; axillaries white vermiculated dusky at tip; under wing-coverts mostly white; *tail-feathers* sepia or mouse-grey with dark shafts; *primaries* sepia or dusky-brown, tipped black-brown faintly glossed olive, inner webs paler shading to white, outer webs of inner primaries more or less white or palest drab; *secondaries* white with broad black tips glossed green and usually more or less vermiculated white, inner ones with inner webs dusky or black-brown, innermost black-brown glossed dull green usually speckled or vermiculated white; *primary-coverts, bastard wing* and *greater coverts* black-brown, in some speckled white at tip, greater coverts glossed dull green; *rest of wing-coverts* dusky-brown or brown-black glossed dull green and more or less speckled or vermiculated white, amount of vermiculation varying individually. This plumage is acquired by a body-moult also innermost secondaries, Sept. to Dec. or even Feb.

ADULT MALE. ECLIPSE.—The body-feathers (back and rump ?) and innermost secondaries are first moulted followed by wings and tail July to Sept. Resembles adult female but easily distinguished by more heavily vermiculated upper-parts and absence of pure white face band. (*Head, neck* and *upper-parts*) fore-head, lores and chin whitish, some feathers tipped black; head and neck all round black-brown glossed dull greenish-black on cheeks and sides of neck, feathers with ashy-white bases ill-concealed on sides of neck; nape in some cinnamon-brown; upper-mantle dusky-black, feathers edged cinnamon-brown and more or less speckled greyish-white, sometimes tipped and vermiculated light auburn; mantle and scapulars black-brown or black coarsely vermiculated white; (*under-parts*) lower-neck dusky-black, feathers fringed yellowish-white; upper-breast dusky-black, feathers broadly fringed white (sometimes speckled with white towards tip and sometimes with subterminal cinnamon-brown shading); sides of body and flanks white or dusky-white vermiculated drab and usually intermixed with drab-brown feathers; feathers of lower-belly suffused pale ash-brown, some vermiculated same; vent as in adult female; under tail-coverts white vermiculated black, some tipped black; *tail* and *wings* as adult winter-summer.

ADULT FEMALE. WINTER.—(*Upper-parts*) broad band at base of bill white, in some ill-defined on chin and white only at extreme point; crown and nape black-brown, feathers more or less edged cinnamon-brown; upper-mantle cinnamon-brown, sometimes faintly speckled white; mantle and scapulars sepia or brown-black, feathers coarsely vermiculated white distally; back and rump as in male; upper tail-coverts sepia tipped cinnamon-brown; (*sides of head* and *under-parts*) cheeks, sides of neck, throat and fore-neck cinnamon-brown, feathers mostly tipped black, in some these areas black-brown; throat and sides of neck sometimes glossed greenish (white bases of feathers usually only partially concealed); feathers of lower-neck and breast dusky-brown shading into cinnamon-brown, in some with narrow white edges; feathers of lower-breast broadly edged white; sides of body and flanks light cinnamon-brown, feathers vermiculated white towards tip; centre of breast and belly white; vent sooty-brown, some feathers vermiculated whitish; under tail-coverts white more or less vermiculated dusky-brown, some tipped blackish; *tail* and *wing* as male but innermost secondaries without vermiculations, at most slightly speckled white towards tip; *wing-coverts* less, and more finely, vermiculated than in male. This plumage is acquired by complete moult Aug. to Dec.

ADULT FEMALE. SUMMER.—The body-feathers are apparently completely moulted April and May but very little material has been examined. Coloration as winter but (*upper-parts*) feathers of crown and nape cinnamon-brown with blackish-brown bases; upper-mantle as winter, rest of mantle and scapulars cinnamon-brown or warm sepia, feathers tipped buff-brown, in some vermiculated whitish at tip; on auricular region whitish patch; (*under-parts*) throat sooty-brown or pale cinnamon-brown, feathers with ill-concealed whitish bases; upper-breast as winter; sides of body and flanks light cinnamon-brown, feathers tipped buff-brown; rest of breast and belly and vent as winter but in some intermixed with sooty-brown feathers, tipped buff or whitish; *tail* and *wings* as winter. *Nest-down* is acquired in spring.

NESTLING.—Like that of Common Pochard but upper-parts usually lighter, being olive-brown with no light patches; in some an ill-defined yellow-brown patch on side of back; cheeks yellow-buff (in some suffused brownish); remaining under-parts light cream-yellow; upper-breast suffused yellow-buff; sides of body, vent and uropygial tuft suffused brown.

JUVENILE. MALE.—Resembling adult winter female but *white band* at base of bill narrower, often absent on fore-head and ill-defined on chin, in some intermixed with brown feathers; *nape* sepia; *lower-neck* and *upper-mantle* sepia speckled white; centre of *mantle* as in adult female but less, and more coarsely, vermiculated; *scapulars* sepia tipped buff-brown, some coarsely vermiculated white towards tip; rest of upper-parts as adult female; *under-parts* as adult female but cheeks, sides of neck, throat and fore-neck lighter cinnamon-brown, neck and upper-breast in some darker; sides of body and flanks buff-brown, feathers with lighter tips, those of lower-flanks more or less speckled or vermiculated white; belly white; feathers of lower-belly and vent dusky-brown (darker on vent) mostly with narrow white tips giving a characteristic barred or streaked appearance; under tail-coverts white with dusky-brown subterminal bars and shadings; *tail-feathers* as adult male in coloration but structure juvenile; *wing* as adult male but *coverts* usually less vermiculated, innermost *secondaries* usually with no vermiculations but sometimes faintly speckled white. FEMALE.—As juvenile male, but *upper-parts* without or with few vermiculations; crown sepia, feathers tipped cinnamon-brown; mantle and scapulars as male but with no vermiculations; centre of mantle dark sepia, feathers tipped buff-brown (sometimes slightly vermiculated at tips); back uniform brown-black with a few white frecklings, not vermiculated white as in juvenile male and adult female; *under-parts* as male but cheeks, sides of neck, and throat lighter, feathers without black-brown tips; fore-neck and upper-breast lighter; flanks with no white vermiculations or speckles; *tail* as male; *wing* as adult female but innermost secondaries and coverts without white frecklings; *median* and *lesser coverts* with no vermiculations, in some with a dusting of tiny white specks.

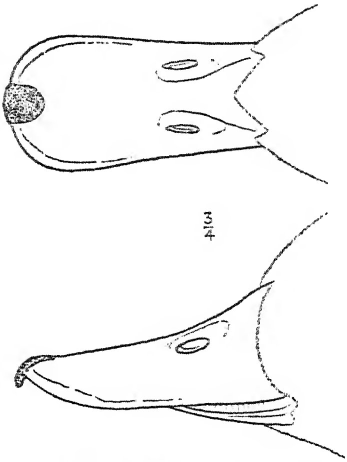
FIRST WINTER AND SUMMER. MALE.[1]—Easily distinguished from adult by retained juvenile body-feathers. In most birds *upper-parts* resemble adult but some juvenile feathers are usually retained on centre of mantle; back and rump browner than in adult; *under-parts* as adult but juvenile feathers often retained on upper-breast, sides of body, flanks and under tail-coverts; rest of breast, belly and vent as in juvenile (sometimes some feathers of belly are renewed); *wing* as in juvenile but new innermost secondaries as adult. Many juvenile body-feathers apparently not back, rump, lower-breast, belly or vent but occasionally belly, tail, sometimes some innermost secondaries are moulted Sept. to April.

FIRST ECLIPSE. MALE.—One July specimen examined (Schiöler coll.) in body-moult into eclipse plumage which appears to resemble that of adult. Feathers of breast, belly and vent were retained juvenile plumage.

FIRST WINTER. FEMALE.—*Upper-parts* as in adult winter female but mantle and scapulars less vermiculated; back as in juvenile; (*under-parts*) new feathers of upper-breast, sides of body, flanks and under tail-coverts as adult female; rest of breast, belly and vent as juvenile. Many body-feathers (apparently not back, lower-breast, belly or vent), some or all tail-feathers but not wings are moulted from Sept. FIRST SUMMER.—Forward young females acquire a certain amount of summer plumage. April specimens examined were acquiring new feathers on head, neck, mantle, scapulars, rump, upper and under tail-coverts, upper-breast, sides of body and flanks, new growing feathers of sides of body and flanks being characteristic of adult summer plumage; rest of breast, belly and vent as juvenile; tail new or in moult and still with some juvenile feathers. One March and one April moulting innermost secondaries. Birds in moult occur from Sept. to April, some acquire a first winter plumage by Jan., others have few new feathers by this date and probably in spring commence to moult straight into first summer plumage or if they only acquire first winter plumage by March probably do not acquire any summer plumage.

MEASUREMENTS AND STRUCTURE.—♂ wing 220–230 mm., tail 50–63, tarsus 35–38, bill from feathers 43–47 (12 measured). ♀ wing 210–220, bill 41–46. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd longest, 3rd equal or 2–3 mm. shorter, 4th 7–10 shorter, 5th 20–22 shorter, 6th 32–38 shorter. Bill about as long as head, as high as broad at base but becoming depressed and broadening to tip which is semicircular, culmen sloping gradually to tip, scarcely concave, nail small and decurved. Other structure as in Common Pochard.

SOFT PARTS.—Bill (ad.) bright lead-blue, slightly darker in female; legs and feet (ad.) lead-blue, duller in female; iris rich golden-yellow. [*A.C.M.* revised by *H.F.W.*]



Bill of an adult male of the Scaup-Duck (*Aythya m. marila*) from above and side.

**Characters and allied forms.**—Vermiculated upper-parts and white speculum distinguish Scaup in all plumages from other British members of genus, but for distinction of those juvenile females with no vermiculations on upper-parts, see Tufted Duck under "Characters." *A. m. mariloides* (Bering Is.) is smaller and male has coarser vermiculations on upper-parts, *A. m. nearctica* (N. America) tends to be larger and darker but intergrades and definite distinction is doubtful. *A. affinis* (N. America) is smaller. *H.F.W.*

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[1] In assumption of this plumage some white flank-feathers, vermiculated and sometimes tipped buff-brown, are sometimes acquired but are soon shed.

[NOTE.—A specimen found in Leadenhall Market, and said to have been taken in Lincs., formed the subject of Donovan's description and figure of *Aythya collaris*, the AMERICAN RING-NECKED DUCK (*Anas collaris* Donovan, *Brit. Birds*, vi, 1809, pl. 147). The bird is an inhabitant of N. America, from British Columbia to northern California, and from Alberta south to Dakota and Wisconsin: in winter south to Porto Rico and Guatemala.]

## Genus **BUCEPHALA** Baird

BUCEPHALA Baird, Rep. Expl. and Surv. R. R. Pac., ix, pp. (L, 788), 795 (1858—Type by original designation *B. albeola*).

Differs from *Aythya* chiefly by bill, which is shorter than head, height at base greater than width, narrower in front than at base, nail mostly wider than in *Aythya*; nostril much nearer tip, fore-part much in front of middle of bill. Tail rounded, 16 rather stiff rectrices. Feathers of crown and nape in *B. clangula* and *islandica* slightly, in *albeola* much elongated, in latter also feathers on sides of head. Nesting in holes. 3 species northern portions of Palæarctic and Nearctic regions.

*PLATES 81, 87a, 88, and 89.*

## 332. THE GOLDENEYE—Bucephala clangula clangula (L.)

ANAS CLANGULA Linnæus, Syst. Nat., ed. x, i, p. 125 (1758—Europe. Restricted typical locality: Sweden).
*Clangula glaucion* (Linnæus), Yarrell, iv, p. 435; Saunders, p. 451.
*Nyroca clangula clangula* (L.), Hand-List (1912), p. 141.
*Bucephala clangula clangula* (L.), Pract. Handb., ii, p. 330.

**Habitat.**—In breeding-season frequents lakes and rivers in forested country. Outside breeding-season mainly marine, frequenting sea-coast and tidal estuaries or river mouths and having, according to Millais, a liking for places where both fresh and salt water are available. Also quite frequent in small numbers on larger fresh waters inland; in Scotland parties often spend whole winter on inland reaches of rivers. *B.W.T.*

**Field-characters and General Habits.**—*Boldly black and white pattern of drake with black head, showing green and purple gloss at close quarters, and circular white patch between eye and bill* are distinctive even at long range. Back and tail black, neck, under-parts and sides white, with black streaks on scapulars and edge of flanks. Wings black with *conspicuous broad white patch on basal half* extending nearly to front edge of wing. Neck looks very short in flight. *Short bill and peaked crown give a "triangular" outline to head* which is characteristic, and this is noticeable feature of the less conspicuous females and young, which are *chocolate-headed, mottled grey birds* (young browner) with wing-patch showing as white mark on sides. Adult females have an obscure whitish collar which immature birds lack. Adult male assumes full plumage at any time between mid-Oct. and latter part of Dec. and retains it till late July or early Aug.; eclipse complete Aug.-Sept. Male is then much like female, but retains some dark green feathers on head. Young males are slow in assuming full plumage; some show traces on head as early as Oct., but many show little change till Jan. or later and white face-patch may appear at any time from Oct. to March. Complete adult plumage is not attained until second winter. Bill of adults blackish, yellowish at tip in female; legs orange in male, paler in female. Total length (ad. male) *c.* 18 ins.; body *c.* 12 ins.; female considerably smaller.

Like Scaup is a hardy species little incommoded by severe weather. Rises more easily and directly from water than other diving ducks; wing-beats especially rapid. *Wings produce characteristic loud "singing" or "ringing" sound*; according to H. Mayhoff this is loudest in adult male, much less, though present, in old females and young males of year, and absent in young females up to first wing-moult. Is restless in disposition and spends much time on wing. When excited neck is stretched upwards and head-feathers puffed out, giving head peculiar "swollen" appearance, and when swimming actively head is advanced in a characteristic way, but ordinary position is low on water with head well sunk. Carriage said to be even more upright than in most diving ducks, but it seldom comes to land. In breeding-season females perch fairly freely on branches of trees, especially when prospecting for holes, but usual habit is to fly directly in and out of holes. At migration times sometimes seen in flocks of a hundred or more (Millais records one of *c.* 1,000), but is usually seen in quite small parties seldom exceeding ten or a dozen and often fewer, often in couples or singly. Rarely associates with other water-fowl. Though Millais describes them as often flighting at night to feed on brackish lagoons or fresh-water lakes and estuaries, experience of most observers is that they are largely day-feeders. Indefatigable divers, they will often dive in preference to swimming when making for a given spot. Feed close to shore in 6–12 ft. of water (C. E. Alford); Millais estimates *c.* 18–20 ft. as maximum, and maximum depth recorded by J. M. Dewar was 13 ft.; average duration of dive 25 secs. (Alford: 170 timed), 23 secs. (T. A. Coward); maximum 36 secs. (Dewar), 55 secs. (Alford). Often descends in spiral where water is still and deep and will turn over stones on bottom (Millais); parties often dive simultaneously. Round coasts of England and much of Scotland "brown-heads" preponderate —according to Millais to the extent of 80 or 90%, but in writer's experience this figure is much too high and is certainly so for many inland waters, where adult males, though reputed rare, are not really uncommon. On more northern coasts adult males tend to be commoner and in certain favoured localities (*e.g.* Moray Firth: Millais) are even abundant. In south of winter-range abroad excess of "brown-heads" seems general. *B.W.T.*

**Voice.**—Generally a silent bird. Female has loud, hoarse note like that of other diving ducks. A low "wah-wah" when "talking" to young (Millais), a squeaking "ach"[1] or "heck" when surprised with brood (Phillips) and a note rendered "cuk-cuk-cuk-cuk" from females searching woods for nest-cavities (F. Harper) are also recorded. Spring display-note of male a harsh, rasping and vibrating double note rendered as "quee-reek" (H. Boase) or (for American race) as "zzee-at" (C. W. Townsend). *B.W.T.*

**Display and Posturing.**—Display attitudes vary a good deal in detail and are hard to summarize. Male may swim round female with head and neck held stiffly at angle of 60–75°, with feathers of cheeks puffed out, sometimes with raised tail, and gradually elevating bill till perpendicular (Millais), or may swim with head thrust forward, dipping bill in water at intervals (W. Brewster). Phillips has seen male suddenly shoot *backwards* 1–2 ft. from this position. From position with neck stretched up and bill either vertical (Phillips) or horizontal (H. Boase) neck is suddenly jerked back so that nape touches rump and after fraction of second is jerked back to normal. Throw-back of head may be followed by up-thrust of tail, so that bird rests momentarily on base of neck in water or, without this movement, head and neck may be jerked into vertical position (Boase). Display-note is uttered when bill is in vertical position either before or after throw-back. Very characteristic is kicking up spurt of water high into air behind the bird, but here also there is variation: it may accompany back jerk of head (H. Wormald, Phillips) and may be performed with both feet together (Phillips), but Millais describes head as suddenly dropped between shoulders, retaining vertical position of bill previously assumed, and two successive kicks being given by alternate feet. D. Gunn records male extending one wing and displaying its boldly patterned upper surface to female by rolling over on side while supporting wing with extended foot (sometimes wing is displayed in wrong direction with reference to female, but this is much less frequent), and female also assumes this posture. Boase records both sexes bobbing head in curved path by rapid retractions of neck and female extending head and neck in line at angle of *c.* 45° or making short runs at drake with head and neck extended horizontally; she may lie out flat on water even though coition does not occur. "False preening" in which sides of head are rubbed on back also occurs in both sexes (Boase). G. Legge observed captive female to throw up head and neck until bill perpendicular, at same time sinking breast so as to elevate tail and kicking up water like male (the two feet in quick succession), but not so high, and Gunn found that, though less demonstrative and vigorous, she performs all the main actions of drake except throw-back of head. She also has special action, usually associated with soliciting posture, in which head is slowly and completely submerged and then carried forwards on a curve having an upward direction, so as to reappear with bill pointing upwards at angle of 45°. As soon as eyes are clear of water movement is arrested, and position retained with whole neck out of sight, while stern is elevated in a humped-up manner though tail not raised off water. After coition male makes a rush along water for 15–20 yds. with breast raised out of water, head depressed backward, and bill in air. For figs., see Millais, vol. i, facing p. 96, and Phillips, vol. iii, pl. 69. Display, or a good deal of it, may be seen before leaving winter-quarters, and Boase records display from immature birds in April. *F.C.R.J. & B.W.T.*

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[1] "Ch" as in "loch."

**Breeding.**—Nests on banks of rivers and lakes where timber exists: under natural conditions breeding in holes of trees and stumps or old holes of Black Woodpecker, but takes readily to nesting-boxes erected for the purpose. Has nested in rabbit-burrows in England. *Nest.*—No material added, but chips of dead wood mixed with down and feathers. Down very pale greyish, centres rather lighter: slight tinge of blue as compared with that of Smew. For feathers see Plate 87A: small feathers white. *Eggs.*—6–15 recorded and 16–22 said to occur (probably two birds laying together): shape blunt ovate: colour bluish-green, not so blue as those of Barrow's Goldeneye: very bright when fresh, but fade. Average of 170 eggs (91 by

H. Goebel, 39 by E. Rey), 59·19×42·55. Max.: 67×39·5 and 60×45. Min.: 52×41 and 55·7×39·4 mm. Average weight (Goebel), 5·8 grams (6·8 to 4·9 gr.). *Breeding-season.*—From mid-April onward in Germany, but in N. Scandinavia hardly before June. *Incubation.*—By duck only, begins on completion of clutch: drake keeps in vicinity. Period 26 days in confinement (J. C. Laidlay): 30 (O. Heinroth). *Fledging.*—Young scramble out of nest and drop to ground or water: tended by duck only: drake takes no part. Period: able to fly in 57 days (Heinroth), 60 days (F. E. Blaauw). Single-brooded. *F.C.R.J.*

**Food.**—Almost entirely animal matter, chiefly Mollusca, both salt- and fresh water (*Littorina, Rissoa, Lacuna, Neritina, Limnæa, Physa, Ancylus, Montacuta*, etc.): Crustacea (small crabs, shrimps (*Crangon*), *Idotea, Gammarus, Talitrus, Cypris, Daphnia*, etc.). Insects (Plecoptera (*Perlidæ*), Odonata (*Libellula* and nymphs), Hemiptera, Trichoptera (larvæ of *Phryganeidæ, Hydropsyche senex*), Coleoptera (*Dytiscus, Helophorus, Curculionidæ*, etc.), and larvæ of Diptera): earthworms, leeches, frogs and tadpoles: small fish (trout, *Cottus gobio*, salmon spawn, and young eel). Only vegetable records are of algæ: remains of plants, and in one case corn, probably from wreck. *F.C.R.J.*

**Distribution.** — *British Isles.* — Passage-migrant and winter-visitor (mid-Sept.–mid-Nov., most arriving from mid-Oct., to mid-March–early May). Has bred. Frequently seen in summer, especially in Scotland, but no proof of breeding except in Cheshire where nests were found in 1931 and 1932 (*Bull. B.O.A.*, No. 59 (1938)). No information as to passage beyond coasts of Brit. Is. in winter, but some evidence of return in April. Generally distributed round coasts, in estuaries, and regularly on many inland waters. *H.F.W. & N.F.T.*

**Distribution Abroad.**—Holarctic region. In Europe breeds possibly in Iceland: Norway to 70°, Sweden, N. Finland, and Russia (to R. Petchora and N. Urals). In Asia in Siberia east to Kamtschatka. In south to Dovre and File-fjeld in Norway, Kroneberg in Sweden, Baltic states, E. Prussia, Poland, Germany, Switzerland, Yugo-Slavia, N. Bulgaria, Romania, and Russia (Pskov, Kaluga, and Astrakhan Govts.). In Asia from Kirghiz Steppes, Semipalatinsk, Tarbagatai, and Altai to N.W. Mongolia. Replaced by an allied race in N. America (Canada and Maine). Winters in Europe south to France (rarely Iberian peninsula) and N. coasts of Mediterranean and Black Seas to Caucasia: also occasionally in Mediterranean Is.: in Asia to Asia Minor, Palestine, Iraq, Persia, Baluchistan, N. India, Burma, China, and Japan. American race south to California, Mexico, and Florida, casual in Bermudas, Greenland, and Pribilof Is. Typical race casual Greenland, Færoes, Azores, Algeria, Malta, and Pribilof Is. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head, neck* and *upper-parts*) head and upper-part of neck all round black, crown, nape, cheeks and sides of neck glossed dark green, in some lights reddish-purple, purple gloss more pronounced in some than in others; roundish white patch on lores; rest of neck and part of upper-mantle white; rest of mantle, inner and lower scapulars, back, rump and upper tail-coverts black; rest of scapulars white broadly bordered black on outer or both webs; *under-parts* white, flank-feathers mostly with broad black border on outer web; feathers around tibia and sometimes sides and lower part of vent ash-brown tipped white; axillaries and under wing-coverts deep mouse-grey ; *tail* mouse-grey ; *primaries* black-brown, paler on inner webs ; outer *secondaries* black-brown often with a white spot towards tip, succeeding ones usually with more or less white on inner web, middle ones white, innermost and coverts black ; all *primary-coverts, bastard-wing* and *lesser coverts* black or black-brown ; outer *greater coverts* black or black-brown, remainder white sometimes tipped dusky-black ; *median coverts* white, inner ones and inner lesser coverts black tipped white. This plumage is acquired by body-moult Sept. to Dec.

ADULT MALE. ECLIPSE.—Like adult female but easily distinguished by white wing-coverts. Head and neck all round, mantle, scapulars, tail-coverts, upper-breast, sides of body, flanks but apparently not rest of body-feathers are moulted first, followed by wings and tail in July and Aug. Like adult female winter-summer, but *head* and *neck* paler brown, sepia rather than bistre-brown ; lores black-brown ; nape dark ash-brown ; scapulars black-brown or sepia tipped ash-brown or ash-grey, some short scapulars edged ash-white ; (*under-parts*) lower-neck and sides of neck ash-brown ; upper-breast and sides of body dark ash-grey, feathers tipped yellowish-white ; flanks as scapulars ; under tail-coverts ash-brown, broadly tipped white, lower ones white marked ash-brown ; remaining under-parts as adult male in winter-summer.

ADULT FEMALE. WINTER AND SUMMER.—*Head* and *neck* all round bistre-brown ; nape ashy, feathers tipped whitish ; (*upper-parts*) lower-neck, mantle and scapulars brown-black, feathers edged dark grey, scapulars mostly edged white or greyish-white ; back and rump black ; upper tail-coverts black, when fresh with dark grey bloom ; (*under-parts*) fore-neck with white collar ; upper-breast, sides of body and flanks deep grey, feathers broadly edged white and often with one web more or less white ; feathers around tibia, sides of vent and sometimes feathers across vent and lateral under tail-coverts deep mouse-grey edged white ; rest of under-parts white ; axillaries, under wing-coverts and *tail* as male ; *wing* as male, but middle *greater coverts* with broad black tips forming a wing-bar ; lower series of *median coverts* black tipped white, upper series mostly white shaded ash-grey towards base (amount of white varies considerably individually) ; *lesser coverts* and bend of wing blackish-grey more or less shaded deep grey towards tip, some tipped white. This plumage is acquired by a complete body-moult Aug. to Dec.

ADULT FEMALE. ECLIPSE.—Feathers of head and neck all round, mantle, scapulars, upper and under tail-coverts, upper-breast, sides of body and flanks followed by wings and tail are moulted July and Aug. Feathers of back and rump and of rest of under-parts are apparently only moulted once. Coloration as in winter-summer but (*upper-parts*) head and upper-part of neck sepia ; nape and rest of neck dark ash-brown with no white collar ; scapulars black-brown, edged dark ash-brown not white ; (*under-parts*) upper-breast dark ash-brown, feathers tipped buff-white ; sides of body and flanks dark ash-brown, feathers tipped brownish-white or greyish-white.

NESTLING.—Down of crown, lores, cheeks and centre of nape, rest of upper-parts, sides of body and back of thighs sepia or black-brown ; a white bar across wing, a white patch on either side of centre of back, another on either side of rump and one above thighs ; rest of cheeks, sides of neck, chin, throat and fore-neck white (in some a dusky spot on chin) ; rest of under-parts white, upper-breast suffused dusky-brown, sometimes a brown patch on either side of vent.

JUVENILE. MALE.—Distinguished from adult female by larger size. In coloration more like adult female eclipse than winter and summer but comparison with latter is here made as it is more generally known. (*Upper-parts*) head and upper-part of neck sepia (not bistre), rest of neck all round dark ash-brown ; feathers of mantle browner, with narrower grey edges ; scapulars black-brown or sepia tipped buff-brown ; (*under-parts*) upper-breast, sides of body and flanks dark ash-brown, feathers mostly tipped buffish ; vent as female but ash-brown ;

rest of under-parts as female; *tail-feathers* as female but tips square and shafts projecting; *wing* as female but white on *greater coverts* usually more extensive and black-brown tips usually narrower forming an ill-defined (in some obsolete) wing-bar; lower series of *median coverts* black, some more or less shaded pale greyish-white towards tip, upper series pale greyish-white, some tipped white forming light patch on wing, varying considerably in extent and whiteness individually; *lesser coverts* as female but lighter, tips narrower.

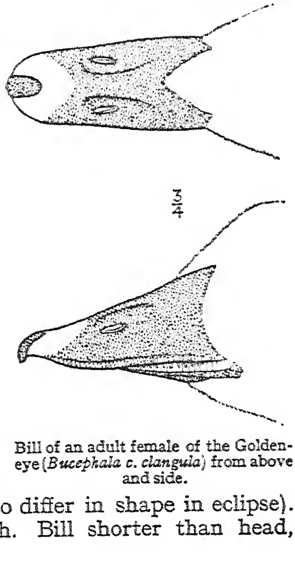
JUVENILE. FEMALE.—As juvenile male but *greater coverts* usually more broadly tipped black as in adult female, *median coverts* usually with less white, upper series blackish-grey more or less shaded pale grey or pale greyish-white towards tip, forming a light patch on wing varying in extent individually. *N.B.*—Juvenile males may usually be distinguished from juvenile females (apart from their larger size) by more extensive light patch on wing, median coverts of which are whiter but in some males these are indistinguishable from those of some females.

FIRST WINTER. MALE.—(*Upper-parts*) head, neck, mantle, and scapulars as adult winter-summer female, but scapulars without or with only a few whitish tips; (*under-parts*) new feathers of upper-breast, sides of body and flanks as adult female; rest of plumage as juvenile. This plumage is assumed in Sept. and Oct. by a partial body-moult and is usually worn only for a short time (though backward birds in first winter plumage may occur in March). FIRST SUMMER.—In forward males, no dividing line can be drawn between these plumages; (*upper-parts*) black feathers glossed green appear on head; lores intermixed with white, in some loral patch almost as much developed as in adults; lower-neck with a white collar intermixed on nape with white feathers tipped ash-brown; new feathers of mantle black narrowly edged deep grey; new scapulars white with outer or both webs narrowly edged black, some blackish-grey with one or both webs shaded silvery-grey or white; (*under-parts*) fore-neck and upper-breast white; sides of body and flanks intermixed with white feathers with outer webs black-brown, some white narrowly bordered black as in adult male, or white more or less marked deep ash-grey; rest of body-feathers as adult female; *tail* as adult male; *wing* as juvenile. Some body-feathers (apparently not back, rump, lower-breast, belly or vent) and tail are moulted from Sept. onwards, but apparently not wings; in less forward males only some of above plumage is acquired.

FIRST WINTER AND SUMMER. FEMALE.—As adult female, but distinguished by juvenile *median* coverts; *scapulars* with dark grey, not white, tips; white collar on *fore-neck* apparently never such a clean white as in adult female; moult apparently as male.

FIRST ECLIPSE. MALE AND FEMALE.—Moult and coloration apparently as in adults; only to be distinguished from adults when juvenile wing-coverts have not been shed.

MEASUREMENTS AND STRUCTURE.—♂ wing 207–227 mm., tail 77–90, tarsus 34–38, bill from feathers 31–36 (12 measured). ♀ wing 197–210, bill 28–31. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd and 3rd about equal and longest, 4th 10–12 mm. shorter, 5th 22–26 shorter, 6th 35–39 shorter; 2nd emarginated inner, 3rd slightly outer webs. Innermost secondaries comparatively short and pointed at tip, equal to or shorter than 6th or 7th primary. Scapulars with square tips, long ones slightly pointed (appear not to differ in shape in eclipse). Tail rounded, 16 stiff feathers of moderate length. Bill shorter than head,



Bill of an adult female of the Goldeneye (*Bucephala c. clangula*) from above and side.

higher than broad at base, gradually depressed, decreasing in breadth towards tip which is rounded; nail, small, narrow, oblong and decurved. Feathers of hinder-crown considerably elongated, most pronounced in adult male, giving head a characteristically triangular appearance.

SOFT PARTS.—Bill (ad. ♂) bluish-black, (ad. ♀) as male but a yellow patch at tip of upper and under mandible surrounding nail, nail and tip of lower mandible bluish-black, (juv. ♂ Oct.) dusky brown-black suffused dull orange, brightest behind nasal opening and on intercrural space, (juv. ♀) bluish-black with no yellow patch which makes its appearance sometimes as early as Dec.; legs and feet (ad. ♂) pale orange, webs greyish-brown, (ad. ♀) brownish-yellow, (juv. ♀) similar to adults but duller; iris (ad. and juv. ♂) bright yellow; (ad. and juv. ♀) dull yellow. [*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—From other British ducks adult male Goldeneye is distinguished by white eye-spot and black and white plumage, adult female and juveniles have head and neck uniform bistre-brown with no white marks as in female and juvenile Buffel-headed Duck. In *B. c. americana* (N. America) male, but not always female, is larger. Adult males of Barrow's Goldeneye, *B. islandica* (Iceland, Greenland, N. America), are easily distinguished by large crescentic white patch on lores, bifid tips of scapulars and flank-feathers and other differences; juvenile and first-winter males have median and lesser coverts darker, sometimes a few median coverts with grey or greyish-white tips but apparently never tipped white as in many Goldeneye; adult female has upper series of median coverts with white tips narrower than in adult female Goldeneye; first-winter females have median and lesser coverts more or less uniform black-brown, a few median coverts with grey or greyish-white tips; wing longer than in Goldeneye, *viz.*, ad. ♂ 235–245, ad. ♀ 210–223, juv. and first-winter ♂ 222–235, first-winter ♀ 209–215. Nail of bill decidedly larger than in Goldeneye. [*A.C.M.* revised by *H.F.W.*]

[NOTE.—An immature male Goldeneye shot on the Alde, Suffolk, Feb. 1, 1908, and thought to be a specimen of BARROW'S GOLDENEYE, *Bucephala islandica* (Gm.) (F. M. Ogilvie, *Bull. B.O.C.*, xxiii, p. 63), was afterwards shown to be *B. c. clangula* (W. R. Ogilvie-Grant, *op. c.*, xxxi, p. 18, *cf. Brit. B.*, vi, p. 272). Two adult males were also said to have been shot in Shetland, March 18, 1913 (*Brit. B.*, vii, p. 21).]

*PLATES 89 and 91.*

## 333. THE BUFFEL-HEADED DUCK—Bucephala albeola (L.)

ANAS ALBEOLA Linnæus, Syst. Nat., ed. x, i, p. 124 (1758—America. Typical locality: Newfoundland).
*Clangula albeola* (Linnæus), Yarrell, iv, p. 442; Saunders, p. 453.
*Nyroca albeola* (L.), Hand-List (1912), p. 142.
*Bucephala albeola* (L.), Pract. Handb., ii, p. 335.

**Habitat.**—Much like Goldeneye. In breeding-season frequents neighbourhood of lakes, ponds, and rivers in wooded country; also rarely in treeless regions. Outside breeding-season chiefly on coast, frequenting bays and estuaries, but also regularly on larger, open fresh waters. *B.W.T.*

**Field-characters and General Habits.**—General plumage pattern strongly recalls Goldeneye, but *considerably smaller* and at once distinguished by *broad white patch behind eye in both sexes*, instead of (smaller) patch in front of eye in drake only. In drake it extends from eye to nape; in duck it is smaller and less prominent, and without aid of glasses, according to C. E. Alford, bird might be mistaken for female Harlequin and possibly female Long-tailed Duck. Harlequin, however, has two white patches in front of eye and the one behind is not so elongated, whilst female Long-tail looks much larger and appears whiter at all seasons. In flight neck does not appear short, as in Goldeneye (L. Griscom). Full plumage of adult male appears to be acquired about mid-Oct.; eclipse is rare in collections and as described by Phillips approaches female, but not very closely. Juveniles resemble females, and young males, as in Goldeneye, colour up slowly, undergoing little change from Oct. to Jan. or Feb., then a partial assumption of adult plumage which is cut short by the moult to eclipse. Bill bluish in adult male, darker at base, dark lead-colour in female; legs pale pinkish salmon in male, brightening to more coral-red in spring, pinkish- to bluish-grey in female (Phillips). Total length *c.* 15 ins.; body *c.* 10 ins.

Rises from water more easily and directly than most other diving ducks; usually flies low. Like Goldeneye, is restless and much on wing and hardly ever forms large packs, dispersing, even where numerous, in small groups and hardly ever consorting with other species (Phillips); usually in parties of 10–15 (Alford). Dives in *c.* 6–12 ft.; average duration of dive (181 timed) 23 secs., longest 29 secs. (Alford). *B.W.T.*

**Voice.**—Notes are merely feeble imitations of Goldeneye's, but is an exceptionally silent bird. Male has little squeaky call probably used in spring only. Female has croak like Goldeneye's, but much feebler, and also when hunting for nest-holes a note like "kuk-kuk-kuk-kuk" similar to Goldeneye's under same circumstances (Phillips). *B.W.T.*

**Display and Posturing.**—Male spreads and cocks tail, puffs out feathers of head and cheeks, extends bill straight out in front close to water and every now and then throws it back with a bob. Prominent features of the display are short flights of males, which fly low over water for very short distance, then check speed and with down-bent wings and heads well up alight tail first with a good deal of splash. There is also much chasing between males (C. W. Townsend). For fig., see Phillips, vol. iii, pl. 69. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds in forested districts of Canada wherever small pools or lakes exist; also in muskegs with a few trees round the edges. *Nest.*—Almost always in an old hole of some species of "flicker," but probably occasionally uses a natural hole and is said to have bred in a gopher's hole in a bank where trees were scarce. No nest-material beyond the fragments of dead wood in the hole and down and feathers. Down pale grey, with slight brownish or purplish tinge and indistinct light centres. Feathers small, white (see Plate 91). *Eggs.*—Usually 8–12, but 7 only and 14–16 on record: blunt ovate or elliptical ovate, creamy like old ivory or pale olive-buff, smooth, with slight gloss and hard shell. Average of 40 eggs, 51·42×36·76. Max.: 55×37 and 52·4×38·2. Min.: 49·1×37·5 and 53·8×34·7 mm. A. C. Bent's average for 86 eggs is less: 48·5×34·7 mm., but his minimum (40×26 mm.) seems to be quite abnormal. *Breeding-season.*—Latter half May and early June. *Incubation.*—By duck alone, a very close sitter. Period: eggs hatched under hen in 21–22 days (D. H. Benedick). *Fledging.*—Young tended by duck. Single-brooded. *F.C.R.J.*

**Food.**—Apparently both animal and vegetable, but chiefly the former. Fish recorded include chub, "shiner," small trout, minnows, etc.: Mollusca (mussels and fresh-water snails): Crustacea (shrimps), Annelida (worms), Hirudinea (leeches) and Insects (Orthoptera (locusts and grasshoppers) and Coleoptera (water-beetles)). Vegetable matter taken chiefly in summer. F. H. Yorke records *Limnobium, Myriophyllum, Callitriche, Utricularia,* and *Pontederia. F.C.R.J.*

**Distribution.**—*Great Britain.*—Four. Adult male Yarmouth (Norfolk) about 1830 (*Birds Norfolk,* iii, p. 222); one Bridlington (Yorks) winter 1864–5 (J. Cordeaux, *Zool.*, 1865, p. 9659); female Tresco (Scilly Isles) Jan. 17, 1920 (H. Langton, *Bull. B.O.C.*, xl, p. 155). Female watched off Norfolk coast several occasions Feb., 1932 (B. B. Rivière, *Brit. B.*, xxvi, p. 326). Others recorded, including two Aberdeen mentioned by R. Gray, not considered authentic (*cf. Fauna Tay Basin,* p. 243). *H.F.W.*

**Distribution Abroad.**—Nearctic region, breeding from British Columbia, Yukon Territory, Alaska, N. Mackenzie, Gt. Slave Lake, coasts of Hudson's and James' Bay to N. Montana. Winters from Aleutian and Commander Is. and Alaska to Mexico and Lower California: and from Montana, Great Lakes and Maine to S. Carolina, Florida, and Gulf coast. Casual Greenland, Bermuda, Cuba, Porto Rico, and Hawaii. (See *A.O.U. Check List,* 4th Edit.) *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head* and *neck*) fore-part of crown, lores, part of cheeks and chin metallic-green, in some lights blue-green, tinged violet or reddish-purple; hinder-crown, rest of neck, throat and fore-neck amethyst, in some lights violet or bronze-purple; broad white band from back of eye encircling occiput; nape metallic blue-green, where bordering side of neck dull green with bronze sheen; lower-neck encircled by a white collar; (*upper-parts*) mantle, inner and long scapulars, back and rump black; short scapulars white, outer webs mostly narrowly edged black towards tip, some with inner web black; upper tail-coverts and sides of rump light ash-grey (in some shading to white at tip), tail-coverts with darker shafts; *under-parts* white, in some belly and vent suffused pale ash-brown; lower flank-feathers narrowly bordered black on outer webs; axillaries white marked dusky, some dusky-brown; under wing-coverts white and dusky-brown; *tail* mouse-grey; *primaries* and outer *secondaries* black-brown paler on inner webs, some secondaries marked white, middle ones mostly white, innermost and their coverts black; all *primary-coverts* and *bastard-wing* black-brown; outer *greater coverts* black or black-brown, rest white; *median coverts* white; inner median and *lesser coverts* black-brown edged white. Very little material in moult examined.

ADULT MALE. ECLIPSE.—(Not examined.) J. C. Phillips describes a nearly fully moulted bird as resembling superficially ad. female but head black with still some purple feathers, white patch on side of head larger and duskier than in female; lower neck pale grey; hind neck and mantle dirty grey; scapulars and back not moulted, worn and paler than in winter-summer, but rump darker; *tail* worn to reddish-brown instead of mouse-grey; *wing* including *coverts* not moulted and as in winter-summer.

ADULT FEMALE. WINTER AND SUMMER.—*Head* and *neck* all round, except nape, black-brown; in some chin, throat, fore-neck, and sides of neck lighter, feathers of fore-neck sometimes with ill-concealed white bases; a white oblong or roundish patch (feathers sometimes tipped dusky) extends from below eye to nape; (*upper-parts*) nape sooty-brown shading to dusky black-brown of mantle and scapulars, in some scapulars and some feathers of mantle fringed brownish-grey; back, rump, and upper tail-coverts black-brown, lower upper tail-coverts dark ash-brown; (*under-parts*) upper-breast ashy-white, feathers with long white fringes; sides of body and flanks ash-grey or drab-grey; lower-belly and vent ash-white, feathers tipped white; feathers around tibia and under tail-coverts drab-grey or ash-grey; remaining under-parts white; axillaries, under wing-coverts and *tail* as male; *wing* as male but *wing-coverts* black-brown, middle *greater coverts* in some with a spot of white on outer web or with both webs more or less white tipped black-brown, in others uniform black-brown. Very little moulting material examined.

ADULT FEMALE. ECLIPSE.—(Not examined.)

NESTLING.—Upper-parts, lores, and crown to below eye dark bistre-brown, whitish bar across wing and patch on side of back and on side of rump; rest of cheeks, sides of neck, chin, and throat white; upper-breast, sides of body, and under tail-coverts greyish-brown or dusky-brown; under-parts greyish-white.

JUVENILE. MALE.—Apparently as adult female but larger and white patch on head usually larger. FEMALE.—Apparently as adult female, but white patch on sides of face smaller. Hardly any juveniles examined.

FIRST WINTER AND SUMMER. MALE.—Apparently assumes only a certain amount of adult plumage. One (March 31, Tring coll.) has white patch on *head* as in juvenile; some new blackish feathers on sides of *neck* and on *crown* and *cheeks* where they are glossed reddish-violet at tip; *nape* intermixed with new white feathers; a few new black feathers on *mantle*; *lower-neck* and *upper-breast* white and some new white feathers on *sides of body* and *flanks*. As in Goldeneye there appears to be a partial first winter plumage; *head* and *neck* as in juvenile; some *scapulars* dark ash-grey with ash-white centres; *upper tail-coverts* ash-grey; new feathers of *sides of body* and *flanks* pale ash-grey, *upper-breast* intermixed with new white feathers; rest of plumage as juvenile in coloration but *mantle* and *scapular* feathers apparently freshly moulted in. Very little material examined. White feathers on nape, black feathers on mantle and white flank-feathers described in March bird are apparently only acquired by more advanced males. FEMALE.—Apparently not to be distinguished with certainty from adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 163–180 mm., tail 70–76, tarsus 30–33, bill from feathers 25–29 (12 measured). ♀ wing 150–163, bill 23–26. Primaries: 1st narrow, pointed and more than half longest primary-covert. 2nd and 3rd about equal and longest, 4th 5–9 mm. shorter, 5th 13–18 shorter, 6th 22–27 shorter; 2nd very slightly emarginated inner web, 3rd outer web. Innermost secondaries equal or shorter than 5th to 7th primaries. Bill much smaller than in Goldeneye and nostrils nearer base of bill. Feathers of hinder-crown and nape elongated in adult male. Other structure as in Goldeneye.

SOFT PARTS.—Bill (ad. ♂) bluish-plumbeous, dusky on nail and at base, (ad. ♀) dusky inclining to plumbeous at end and along commissure; legs and feet (ad. ♂) pinkish or lilaceous-white, (ad. ♀) dilute lilac-pink, joints and webs darker; iris very dark brown. [*A.C.M.*]

**Characters.**—No subspecies. Adult male distinguished from other British ducks by small size, metallic blue-green and amethyst-purple head and neck, broad white band across occiput and pied plumage; females and juvenile male by small size, dark brown head and neck with oblong white patch on sides of head. [*A.C.M.*]

## Genus **CLANGULA** Leach

CLANGULA Leach, Ross's Voy. of Discovery Baffins Land, etc., App. p. xlviii (1819 —Monotype *Clangula glacialis=hyemalis*).

Bill shorter than head and shorter than tarsus, high at base, cutting edge of upper mandible ascending rapidly towards nail, which occupies whole tip of bill. Culmen straight, but nail slightly elevated. Nostrils close to feathers. Feathering advancing farthest on culmen, on sides of culmen forming a nearly straight oblique line. Rectrices 14, exceptionally 16, tail strongly rounded, rectrices pointed, those of male greatly elongated. Sexes very different, summer and winter also. One species in arctic regions of Northern Hemisphere. Maritime duck.

*PLATES 81, 87a, and 89.*

## 334. THE LONG-TAILED DUCK—Clangula hyemalis (L.)

Anas Hyemalis Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—N. Europe and America. Restricted typical locality: N. Sweden).
*Harelda glacialis* (Linnæus), Yarrell, iv, p. 446; Saunders, p. 455.
*Clangula hyemalis* (L.), Pract. Handb., ii, p. 339.

**Habitat.**—In breeding-season frequents fresh waters of the high north, including small tundra and fell pools and lochs, as well as larger lakes and rivers, but also resorts to salt water of fjords, etc. Out of breeding-season throughly marine, usually resting and feeding well away from shore, though sometimes close in, and seldom resorting to coastal fresh waters, though doing so regularly in small numbers in some localities; rare (odd birds or couples) on open lakes or reservoirs inland. *B.W.T.*

**Field-characters and General Habits.**—*In winter mainly white head, white flanks and belly of adults of both sexes, with drake's bold pattern of dark brown and white and his long pointed tail*, often trailed on water but raised when excited, are distinctive, but *rather small delicate head, short bill and steep fore-head* are equally characteristic and aid recognition in other plumages. *Call of male* (*q.v.*) is also distinctive. Male has head and neck, scapulars, belly and flanks white, with patch on side of neck, broad pectoral band and middle of back dark brown. Female has whole back mottled dark brown, white head with dusky crown and patch on upper neck, and white under-parts with obscure brownish pectoral band. Both sexes have wing uniform blackish without bars, and white scapulars of drake in winter-plumage form two broad white streaks which, in conjunction with dark wings, afford further useful character of flying birds. Between Feb. and June drake assumes a distinct plumage (complete about May) with *sides of face white, but rest of head, neck, and breast dark brown, while whole back, including scapulars, is warm brown with blackish centres to feathers.* The eclipse, acquired late July-Aug., is duller, but much the same, except for loss of long tail-feathers, and gives place to winter-plumage in early Oct. or rather later. Female in summer has head mainly dark with whitish area surrounding eye, upper-parts darker and duller than in winter, breast brownish, and more or less indication of a whitish collar. Juveniles have uniform dull grey backs and heads somewhat like female, but much dingier, with more or less whitish on sides of face, but throat brownish, not white or whitish. By end Oct. or Nov. they show more or less of white adult feathering on head and neck and by end Nov. or Dec. development of more or less white on scapulars makes sex easily determined. Except for incomplete breast-band adult plumage is complete by end Mar., when summer plumage is assumed (Millais). Various transitional stages may be puzzling, but from form of head and bill and general characters already given, species should never be in doubt. Bill of adult male pink or orange with black base and tip, of female blackish; legs slate-grey. Total length *c.* 17 ins. exclusive of long central tail-feathers of male, which add about 5 ins. to length; body *c.* 11½ ins.

A lively, restless, noisy bird, delighting in the open sea. Usually not at all shy. Flight distinctive, low down except when migrating, and swinging from side to side in a characteristic manner, so that now the white under- and now the dark upper-parts are turned to the observer. Wing-action is also peculiar: wings are held more curved than in other ducks and are brought much less above body on upstroke and much lower on downstroke, while on latter wing-tips appear to move backwards rather than vertically downwards (L. Griscom). Flies in irregular flocks or straggling lines. Has habit of dropping abruptly breast first on to the water instead of gliding down like other ducks. In winter reluctant to fly over land when this can be avoided, and on breeding-grounds has been described as following every turn of winding streams, but this is not always so, for E. M. Nicholson observed a regular flighting movement inland every evening in Greenland and they are not uncommonly seen in the breeding-season on quite isolated lochs. Gait described as markedly upright, but seldom comes on land. Markedly gregarious, often occurring in large flocks, though these tend to split up into parties of a dozen or so on the water; seldom mixes with other species, however. Almost exclusively a day-feeder, though Millais describes them as active all night. Duration of dives often rather long, described by C. E. Alford as usually 30–40 secs., by Phillips as 30–60; longest recorded dive 90 secs. (L. M. Turner). According to Naumann will dive to depths as great as *c.* 54 ft., but Millais states that it becomes thin if it dives much in 30 ft. In diving head is thrown well back and then plunged forward (Millais); spreads tail and often partly opens wings as it submerges and is stated often to use them under water. Will sometimes dive from the wing and when alarmed or excited will emerge from the water with wings open (H. W. Robinson). In Orkney males outnumber females and young by *c.* 3 : 1 (Robinson). Off English coasts immature birds generally preponderate. *B.W.T.*

**Voice.**—Call of male, used at all hours and on water or in air, is a loud resonant polysyllabic note, variously rendered "ow-ow-owdl-ow," "cah-cah-coralwee," "calō-calōō," etc., difficult to convey in words, coming with quite musical effect from flocks at sea, compared by some to sound of distant bagpipes or even of hounds. Uttered with throw-up of head and open bill. Note of female (seldom heard) is described as soft "ved," "vahd," or "vood" (B. Hantzsch); resembles low or distant bark of dog (E. M. Nicholson). *B.W.T.*

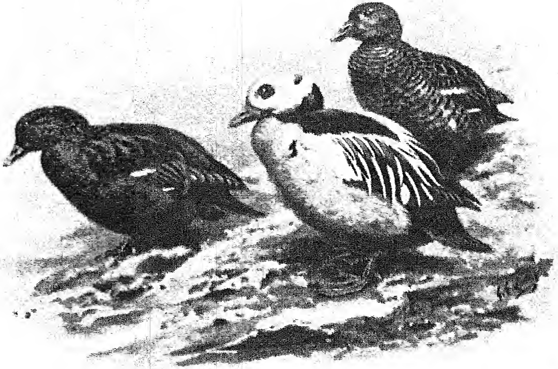
**Display and Posturing.**—In display, which may be seen before winter-quarters are abandoned, a number of males commonly crowd round one duck, erecting tail, stiffening neck to fullest extent, and then lowering it towards female with sudden bow and accompanying call. Male also throws head back till it almost touches scapulars, with bill pointing upwards, and utters call as head is thrown forward again. Both sexes also stretch out head and neck along the water and there is much bickering and chasing between males (Millais). Pursuit-flights on breeding-ground are also common. E. M. Nicholson records female successfully diverting Red-throated Diver from attack on young by "injury-feigning." *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds on islands in lakes and fjords: also on tundra, sometimes in open among stunted heather or willow-scrub: at other times sheltered by rocks, so that it may be said to be inside a recess at times. *Nest.*—Placed in hollow on ground: little material except a few grasses or heather twigs and down, which is generally very compactly and neatly arranged: sprays small, very dark sooty-brown with definite light centres (H. Noble's description in *Brit. B.*, ii, p. 39 is very unconvincing). For feathers see Plate 87A. *Eggs.*—Usually 6–8, but 5, 9 to 11 recorded: 13 and 17 from America seem to be due to two birds: shape ovate or elongated ovate: often pointed, smooth, olive-buff, or yellowish, only exceptionally greenish. Average of 114 eggs (83 by H. Goebel), 53·79×38·21. Max.: 59·5×40 and 57·5×40·5. Min.: 48·8×34·4 mm. Average weight (Goebel), 3·04 grams (3·4 to 2·5 gr.). *Breeding-season.*—From last days of May through June and even July in the high north. *Incubation.*—By duck only: drake remains at hand for a time before flocking. Period probably 23½–24 days under natural conditions: imported eggs hatched in 24–25 days (J. M. Derschied). *Fledging.*—Young tended by duck only, which dives to bring up food at first, but broods apt to combine with both ducks in charge: drake in moult. Period about 5 weeks (B. Hantzsch). Single-brooded. *F.C.R.J.*

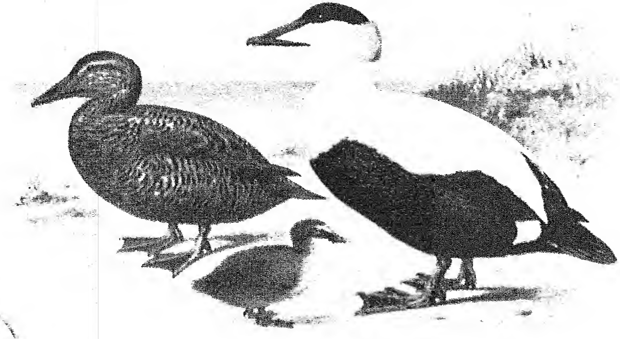
**Food.**—Mainly animal matter, especially Mollusca (*Buccinum* (small), *Littorina littoralis, Lacuna divaricata, L. vincta, Rissoa parva, Cingula semicestata, Hydrobia ulvæ*, Pteropoda, *Patella, Mytilus edulis, Cardium edule, Tapes, Syndemia*, etc.): also Crustacea (small crabs, shrimps (*Crangon*), Gammaridea, etc.): Annelida (small red worms): in summer also insects and their larvæ (Hemiptera (*Corixa*), Diptera (*Chironomidæ*, etc.)). Some fish also taken, codling, small plaice: one choked by *Cottus*. Vegetable matter includes algæ, roots of aquatic plants, mosses, and occasionally grain (wheat, barley, etc.) from wrecked ships. *F.C.R.J.*

**Distribution.**—*British Isles.*—Winter-visitor (end Sept.–end Oct. to March-May, occasionally summer, and possibly a few resident). Regular visitor E. coast *Great Britain*, occasional S. and W. coasts England and Wales. On southern half of W. coast *Scotland* scarce, in N.W. and Inner Hebrides fairly common, in Outer Hebrides and N. coast plentiful and very common Orkneys and Shetlands. In *Ireland* somewhat irregular, and visits chiefly N. and W. coasts. On inland waters vagrant of exceptional occurrence. Eggs apparently of this species taken several times Shetlands; breeding reported and eggs taken summer 1911, Orkneys (O. V. Aplin, *Zool.*, 1911, p. 432; *cf. Brit. B.*, v, p. 203; vi, pp. 128, 199, 263; vii, p. 205), breeding reported in 1912 probably correct but not corroborated, and may have bred 1926 (*op. c.*, xxi, pp. 36, 69); some evidence of previous nesting Orkneys. *H.F.W.*

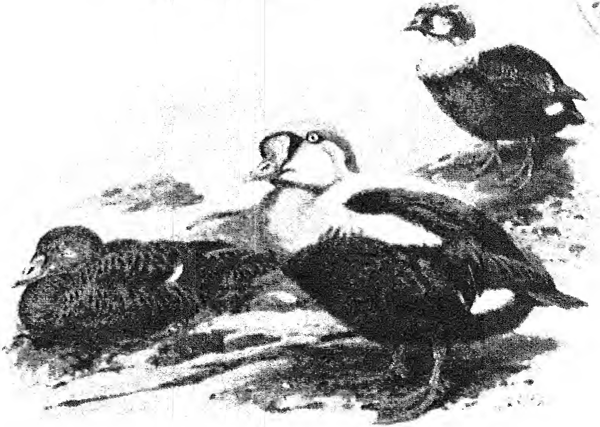
**Distribution Abroad.**—N. Holarctic region. In Europe breeds in Iceland, Bear Is., Spitsbergen, Norway to 71°, N. Sweden, N. Finland, Russia (Kolguev, Novaya Zemlya, Dolgoi, Waigatz, and Archangel to Yalmal). Also in N. Siberia east to Kamtschatka and Commander Is. In south to Dovrefjeld and Valders in Norway, S.W. Finland, and Russia to Olonetz Govt. In America from Aleutian Is. and Alaska to Labrador and Greenland. Winters south to Færoes, coast of Baltic, N. France, Holland, Belgium, and Black Sea: occasionally Switzerland, N. Italy, Austria, Yugo-Slavia and Romania, and in Asia from Caucasia to N. Persia, Aral region, Syr-Darya, Baikalia, China, and Japan. Casual Azores, Madeira, Iberian peninsula, S. France, Sardinia, S. Italy, and occurs Jan Mayen; once Baluchistan and Assam.



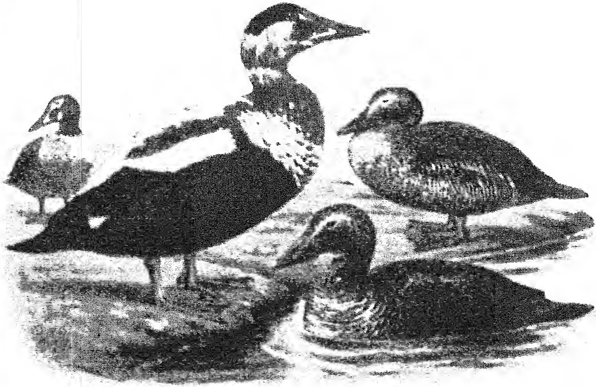
*Ad. f.* *Ad. m.* *Juv.*
STELLER'S EIDER (*ca.* ⅛)



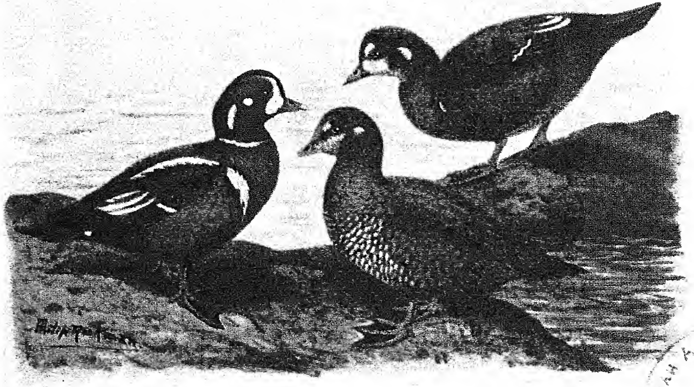
*Ad. f.* *Ad. m.*
COMMON EIDER (*ca.* ⅛)



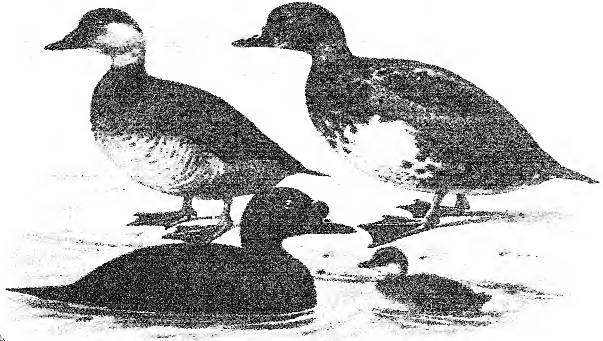
*Ad. f.* *Ad. m.* *1st summer m.*
KING-EIDER (*ca.* ⅛)



*1st winter m. Ad. m. moulting from eclipse. Ad. m. eclipse. Juv. (upper) moulting.*
COMMON EIDER (*ca.* ⅛)



*Ad. m.* *Ad. f.* *Ad. m. eclipse*
HARLEQUIN-DUCK (*ca.* 1/8)



*Ad. f.* *Ad. m.* 1st *winter m.*
COMMON SCOTER (*ca.* 1/8)

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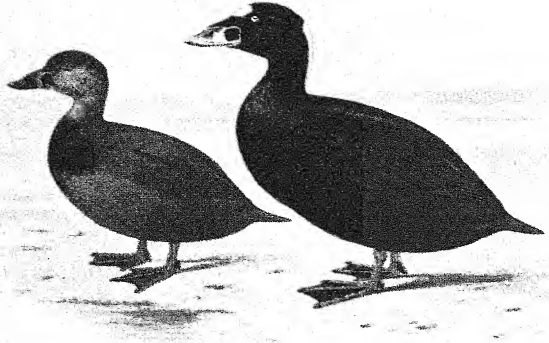
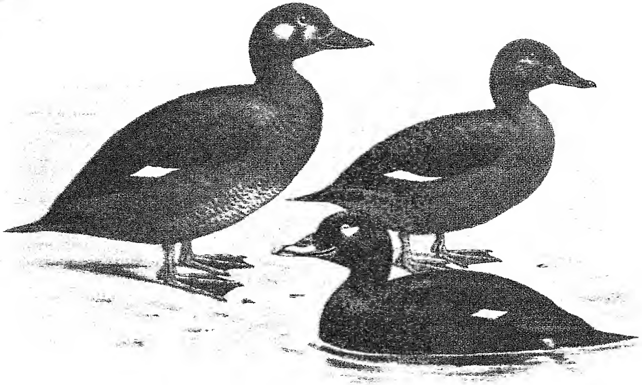


*Ad. f.* *Ad. m.*
SURF-SCOTER (*ca.* 1/8)



*Juv. m.* *Ad. m.* *Ad. f.*
VELVET-SCOTER (*ca.* 1/8)

American birds migrate to middle states of U.S.A.: casual California to Florida. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER.—(*Upper-parts*) base of upper mandible and crown white, fore-part of crown more or less washed cream-buff; nape white; upper-mantle white (in some suffused palest grey); scapulars pallid mouse-grey, lower scapulars black-brown; sides of rump and lateral upper tail-coverts white, some tipped or with inner webs dusky-black; rest of upper-parts black or black-brown; (*sides of head*) lores, cheeks, and eye-stripe drab-grey, round eye a circular white patch; sides of neck black-brown merging into snuff-brown; (*under-parts*) inter-crural space dusky-brown; chin, throat, fore-neck, and part of upper-breast white; rest of breast black-brown or dark sepia (feathers when fresh with faint white tips) with a convex outline sharply defining it from rest of under-parts which are white, sides of body and flanks suffused pallid mouse-grey; axillaries and under wing-coverts sepia; two central pairs of *tail-feathers* black-brown, shorter pair narrowly bordered white, next pair more or less mouse-grey edged white, remainder mostly white; *primaries* and their coverts black-brown shading to hair-brown on inner webs; *secondaries* hair-brown, outer webs tinged sepia which shades to warm sepia on inner secondaries, innermost black-brown with outer webs warm sepia; *greater coverts* and *bastard-wing* black-brown or sepia; *median* and *lesser coverts* black, some lower median with faint warm sepia edges, some lesser, edged light sepia. This plumage is acquired by complete body-moult Aug. to Nov.

ADULT MALE. SUMMER.—Feathers of head, neck, mantle, scapulars (sometimes some on back and rump), upper-breast, and flanks are moulted Feb. to June but not rest of body-feathers (not brown area of breast), tail or wings. Sometimes many winter feathers are retained on head, neck, mantle, etc. (*Sides of head*) lores and cheeks as winter; narrow line at base of upper mandible, fore-head, rest of head and neck all round, and *upper-breast* black-brown or sepia; feathers of *upper-mantle* and *upper-scapulars* with triangular black centres and broad russet edges, *long scapulars* black-brown similarly edged (sometimes some edged white); rest of *upper-* and *under-parts* as winter, new *flank-feathers* suffused russet towards tip.

ADULT MALE. ECLIPSE.—This plumage is acquired by a partial moult of head, neck, upper-mantle, scapulars, sides of body and flanks followed by wings and tail July and Aug. (*Upper-parts*) some new black-brown feathers are acquired on crown and nape, also on upper-mantle, which with abrasion of russet edges of summer feathers causes upper-mantle to appear darker than in summer; new scapulars brownish or sooty-brown, some uniform, others, especially longer ones, more or less shaded and broadly edged buff-brown; (*under-parts*) sides of body and flanks with new drab feathers, drab-grey towards base; rest of plumage that of worn summer. *N.B.*—Above description is of a male (E. L. Schiöler coll.) in a flightless condition with tail-feathers worn, but it is impossible to say whether the bird is fully adult or in its second year.

ADULT FEMALE. WINTER.—(*Upper-parts*) fore-head dusky-brown, feathers with white bases (sometimes fore-head white); crown black-brown, feathers with ill-concealed white bases; nape white, sometimes some feathers tipped blackish; mantle and scapulars black-brown or sepia, feathers with russet edges; lower scapulars black-brown narrowly edged light buff; back, rump and upper tail-coverts black, feathers broadly tipped cinnamon-buff (back sometimes uniform); sides of rump white; upper tail-coverts black-brown, outer webs of lateral ones white; lores and patch round eye white; whitish streak behind eye; on *side of neck* a patch of black-brown feathers with ill-concealed white bases; (*under-parts*) chin, throat and rest of neck white, feathers of inter-crural space (and in some chin) dusky; upper and sides of breast ash-brown, feathers suffused light cinnamon-buff towards tip; lower-breast ash-brown, feathers broadly fringed white; flanks white, sometimes suffused palest grey; rest of under-parts white; axillaries and under wing-coverts as male; central pair of *tail-feathers* black-brown faintly edged white, remainder more or less dusky-brown edged white, outer ones mostly white; *wing* as male but outer webs of secondaries (including innermost) usually not so richly coloured; *greater coverts* sepia or black-brown narrowly edged buff; *median coverts* black-brown or sepia tinged and with deep buff edges; coverts at bend of wing and *lesser coverts* brown-black. This plumage is acquired by complete moult July to Nov.

ADULT FEMALE. SUMMER.—Some feathers of head, neck, mantle, scapulars, sometimes some of back and rump, some upper tail-coverts, upper-breast, some feathers of sides of body and flanks are moulted April and May but not rest of body-feathers, tail, or wings. (*Head* and *neck*) fore-head and crown as winter; lores, and patch in front of eye continuous with patch on side of neck sepia or black-brown; chin and throat dusky-brown, feathers with ill-concealed white bases; patch round eye, streak behind eye and patch on sides of lower-neck whitish, feathers mostly tipped dusky; centre of nape sooty-brown; (*upper-parts*) upper-mantle and scapulars brown-black, feathers of mantle with narrower edges of cinnamon-buff or russet (scapulars edged cinnamon-buff), whole tone of upper-parts darker and duller than in winter; (*under-parts*) upper and sides of breast hair-brown, feathers fringed yellowish-white or light greyish-olive; rest of body, *tail* and *wings* as winter. Upper-parts and wing-coverts become abraded and faded in late summer.

ADULT FEMALE. ECLIPSE.—Examination of scanty material available reveals existence of traces of an eclipse plumage as in male but more material is required before anything more definite can be said.

NESTLING.—Crown, cheeks, all upper-parts, sides of body and thighs black-brown, down with golden-brown tips; (upper-parts with no light patches); cream spot on lores; small white patch below and in some above eye; small white streak (absent in some) extending from behind eye towards nape; upper-breast dusky-brown; remaining under-parts greyish-white, down with dusky-brown bases.

JUVENILE. MALE AND FEMALE.—Easily distinguished from adult female by more uniform mantle, back and rump, feathers having no russet edges, and scapulars sepia shading to buff-brown at edge. (*Upper-parts*) fore-head and crown black-brown; nape and lower-neck drab; upper-mantle drab or sooty-brown, feathers sometimes edged buff-brown; scapulars sepia shading to buff-brown at edge and broadly tipped same; rest of mantle, lower scapulars, back, rump, and central upper tail-coverts sooty-brown or brown-black (sometimes feathers edged buff-brown); sides of rump and lateral upper tail-coverts ashy-white, feathers tipped brown; (*sides of head*) whitish patch usually on lores and another below eye; streak above and behind eye more or less white, feathers tipped dusky; cheeks, upper-part of sides of neck, chin, throat and fore-neck drab-brown, rest of side of neck white; (*under-parts*) upper-breast pale drab-grey or sooty-brown, feathers edged buff; sides of body and flanks pale drab-grey, feathers with buff-brown tips; remaining under-parts white, feathers when fresh with faint terminal dusky lines; *tail-feathers* sepia narrowly edged white, outer ones dusky-brown (in some more or less whitish), broader than in adult and with square, instead of pointed, tips; *wing* as in adult male but *secondaries* including innermost, light sepia or hair-brown (not rich warm sepia), innermost shorter than in adult and with rounded, instead of pointed, tips; *wing-coverts* black-brown or sepia, *greater* and a few *median* tipped buff-brown.

FIRST WINTER. MALE.—A certain amount of grey plumage like that of adult winter is acquired but first winter males always distinguishable by retained juvenile body-feathers, and worn juvenile tail and wings; occasionally two central pairs of tail-feathers are moulted, new central pair as in adult male but much shorter, next pair black-brown edged white and pointed at tip but not long and tapering as in adult. Some feathers of head, neck, mantle, scapulars, rump, tail-coverts, upper-breast and flanks but not rest of body-feathers, not usually tail and not wings, are moulted Oct. to March. *N.B.*—Amount of 1st winter plumage assumed varies considerably individually; birds occur in Feb. still in full juvenile plumage with no signs of moult.

FIRST SUMMER. MALE.—This plumage is acquired by a partial moult of head, neck, mantle, scapulars (in some back and rump), upper tail-coverts, upper-breast, sides of body and flanks from March to June but not rest of breast, belly, vent or under tail-coverts, not tail or wings. Sometimes few, if any, first summer feathers are acquired. Most advanced males have (*head* and *neck*) crown, nape, cheeks, and sides of neck as adult summer male; chin and throat sooty-brown, feathers with broad white imperfectly concealed bases and intermixed with worn white feathers; (*upper-parts*) new feathers of mantle, scapulars, back, rump, and upper tail-coverts as in adult but new long scapulars shorter; upper-parts usually intermixed with feathers of juvenile or 1st winter; (*under-parts*) new feathers of upper-breast black-brown, sometimes with imperfectly concealed white bases, breast never apparently so extensively black-brown as in adult male; rest of under-parts as juvenile; *tail* and *wing* as juvenile, occasionally two central pairs of tail-feathers new (see 1st winter plumage).

FIRST ECLIPSE. MALE.—(Not examined.)

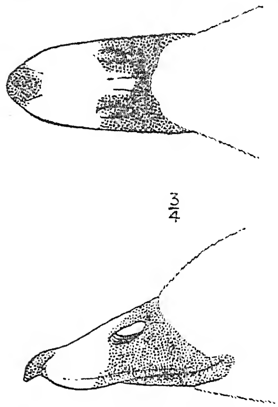
SECOND WINTER AND SUMMER. MALE.—As adult, but long pair of central tail-feathers considerably shorter.

FIRST WINTER. FEMALE.—Like juvenile, but (*upper-parts*) head and neck as adult; new feathers of upper-mantle black-brown edged at sides light-grey; new scapulars with sepia centres, more or less concealed by broad grey edges; new feathers at sides of upper-breast with paler dusky centres and pale grey tips, those of rest of upper-breast white; new feathers of sides of body and flanks white, in some suffused palest grey. Most feathers of head, neck, mantle, and scapulars, some upper tail-coverts, some feathers of upper-breast, sides of body and flanks, but apparently not back and rump and not rest of under-parts, tail or wings are moulted Oct. to March. *N.B.*—Moult into first winter is often very partial.

FIRST SUMMER. FEMALE.—Easily distinguished from adult summer female by retained juvenile body-feathers, worn juvenile tail and wings and darker upper-parts with hardly any indication of cinnamon-buff edges. In some many feathers of upper-parts, including back, rump, and upper tail-coverts, head, lower-neck, sides of body and flanks, but not tail or wings are moulted April and May. As in male, birds in moult occur from Oct. to June and it is impossible to separate the moult into 1st winter plumage from that into 1st summer. Like 1st winter but *nape, sides of neck, throat,* and *lower-neck* intermixed with black-brown feathers with whitish bases; new feathers of *mantle* and *scapulars* black-brown with dusky-brown bases, some scapulars bordered buff-brown on outer web; rest of plumage as in 1st winter, *wings* and *tail* as juvenile.

SECOND WINTER. FEMALE.—Birds with feathers of *upper-mantle* with one or both webs at sides more or less pale grey tipped cinnamon-buff and *scapulars* with grey not russet edges may be second winter females, but more material is required to make certain. The same differences apply to a possible second summer plumage.

MEASUREMENTS AND STRUCTURE.—♂ wing 219–236 mm., tail 199–246, tarsus 32–35, bill from feathers 26–29 (12 measured). ♀ wing 202–210, bill 23–28. Primaries: 1st narrow, pointed and more than half longest primary-covert, 2nd and 3rd usually equal and longest, 2nd sometimes 3–4 mm. shorter, 4th 9–13 shorter, 5th 21–30 shorter, 6th 35–45 shorter; 2nd emarginated inner, 3rd outer webs. Innermost secondaries of moderate length, pointed at tip and shorter than 6th or 7th primary. Scapulars long, tapering to a point, almost reaching 4th primary ; shorter in summer plumage ; short and with square or slightly rounded tips in eclipse. Tail with 14 feathers, in adult ♂ central pair long and tapering exceeding next pair by 70–130 mm., next pair usually long and tapering but varying in shape and length individually but considerably exceeding rest, which are pointed and gradually decrease in length to outermost. Bill small, much shorter than head, about same height and breadth at base, gradually depressed and narrowed towards end, which is rounded ; nail large and decurved ; cutting edge of upper mandible with basal half nearly straight then suddenly rising to nail ; feathering at base of bill forming a nearly straight oblique line advancing farthest forward on fore-head and with hardly any re-entrant angle.



Bill of an adult male of the Long-tailed Duck (*Clangula hyemalis*) from above and side.

SOFT PARTS.—Bill (ad. ♂) basal half black, terminal portion rose-red to orange-yellow, nail bluish-grey, (ad. ♀) greyish-black, (juv. ♂) blue-grey ; legs and feet (ad. ♂) light bluish-grey, webs dusky, claws black, (ad. ♀) greenish-grey, webs dusky, (juv. ♂) pale grey, webs nearly black ; iris (ad. ♂) carmine to hazel, (ad. ♀) yellow, (juv. ♂) brown. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Distinguished in all plumages by small bill and brown speculum. [*A.C.M.*]

## Genus **HISTRIONICUS** Less.

HISTRIONICUS Lesson, Manuel d'Orn., ii, p. 415 (1828—Type expressly mentioned "*Anas histrionica L.*").

Bill about half as long as head, shorter than tarsus, very narrow, much tapering towards tip. Nail occupying entire tip of bill and extending far back on culmen, often without distinct demarcation-line. Nostrils in basal half of bill. Tail rather long, much graduated and pointed, 14 rectrices. Sexes very different. One species.

*PLATES 90a and 91.*

## 335. THE HARLEQUIN-DUCK—Histrionicus histrionicus histrionicus (L.)

ANAS HISTRIONICA Linnæus, Syst. Nat., ed. x, i, p. 127 (1758—America. Typical locality : Newfoundland).
*Cosmonetta histrionica* (Linnæus), Yarrell, iv, p. 452 ; Saunders, p. 457.
*Histrionicus histrionicus histrionicus* (L.), Pract. Handb., ii, p. 346.

**Habitat.**—In breeding-season frequents swift rivers and streams, often near waterfalls. In winter frequents coasts, but unlike other diving ducks prefers "the roughest, rockiest shores of headlands and outer islands where the surf breaks over hidden ledges" (Phillips). *B.W.T.*

**Field-characters and General Habits.**—Drake easily identified ; *vivid white streaks on neck and breast, and chestnut flanks*, showing conspicuously even in poor light. Duck often compared to female Buffel-head and distinguished by two light spots in front of eye (another difference is that white spot behind eye is round, not elongated), but L. Griscom stresses that female

Harlequin is larger and much darker bird, shade of brown rather suggesting a female Scoter or young Long-tail, and latter is most likely bird to be confused with female Harlequin, since at distance detail of Harlequin's two light spots becomes dim and both give effect of light sides of head. Light belly of Long-tail, if it can be seen, is then a valid distinction. "Apart from plumage, following points are aids: shortness of bill (equally noticeable, however, in Long-tailed Duck), extreme buoyancy, habit of keeping apart from other species, and—most characteristic—manner of swimming, either so closely abreast that flank of each individual touches that of its neighbour, or in step-like formation, manœuvre executed with wonderful precision and at once distinguishing species" (C. E. Alford). Ground-colour of drake is *dark blue-grey* (looking black at distance: R. T. Peterson); the black-bordered white marks consist of roughly triangular patch occupying nearly whole side of face between eye and bill, spot on ear-coverts, elongated patch on neck, incomplete collar, and crescent on sides of breast; scapulars partly white, metallic purple speculum, inner secondaries mostly white, short white wing-bar. Female is uniform dull brown, with dull whitish breast and white spot behind eye as well as the two in front, of which upper one is fairly distinct, the lower larger with obscure boundaries. Full plumage of male complete from Oct. to July; eclipse not complete till end Aug. (Millais). Male in eclipse is distinct from female, being dull slaty above, blacker below, without whitish on under-parts; white face markings retained, though duller, rest lost. Juveniles resemble female; change towards adult plumage proceeds slowly at first, then faster from late Nov. or thereabouts (Millais), but is not completed in first year. Bill of adults lead-blue with paler tip, duller in female, legs bluish. Total length *c.* 17 ins.; body *c.* 11½ ins.

Flight rapid, swinging from side to side even more frequently than Long-tailed Duck and when on streams following every turn of these (Millais); in small and very compact flocks (Phillips). Walks with ease on rocks, etc., and in breeding-season will perch on submerged logs, etc., where available. Sits high on water and has habit of jerking head backwards and forwards at each stroke of legs; groups on water pack closely (for characteristic formations, see above). Parties seldom exceed 8 individuals (Alford), though occasionally in considerable flocks, especially at migration times (Millais, Phillips). Almost entirely a day-feeder. Unlike other diving ducks they delight to feed in the roughest water broken by rocks and surf; they often have favourite feeding-grounds, usually off end of particular ledge of rock, and in breeding-season often dive in the agitated water close to falls. According to Alford dives in *c.* 12 ft., but evidently often does so in less. Duration of dive seldom exceeds 28 secs. (Alford). Frequently dives from the wing (Phillips). Uses partially opened wings under water, moving them in quick jerks, but C. W. and E. Michael in close observations on birds of Pacific race found that they were closed on reaching bed of stream where birds walked on bottom in dipper-like fashion, facing into current with head held down. Will also wade in shallow streams where they can feed by merely immersing head (Phillips) or "up-end" like surface-feeders (Michael). W. Palmer records Harlequins regularly roosting on rocks of the Pribilof Is. *B.W.T.*

**Voice.**—Generally a silent bird. Display-note of male, also heard in winter when feeding or about to take wing, is low, piping whistle (C. E. Alford), described by B. J. Bretherton as descending in cadence from a high to a lower note, commencing with two long notes and running off in a trill.

B. Hantzsch renders note of male in breeding-season as " giā," presumably the same as the above, and says female uses softer version of same. Millais mentions a low or hoarse " hū " or " heh-heh " from males. Note of female a low, harsh croak, rendered " ek-ek-ek-ek " (Millais). Also warning notes, a fine " dü " or soft " dā " (Hantzsch). *B.W.T.*

**Display and Posturing.**—Male throws head far back with open bill pointed vertically and then thrown forward and downward as cry is uttered; at same time wings are slightly expanded and drooped (B. J. Bretherton). B. Hantzsch speaks of drake stretching up neck and erecting head-feathers and both sexes bowing to one another. C. W. and E. Michael (in Pacific race) describe pair " bobbing and bowing to one another, swirling round, touching their bills together and uttering little chatty sounds." Pursuits of females by parties of males occur all the winter (A. Brooks). *F.C.R.J. & B.W.T.*

**Breeding.**—A sociable breeder, several pairs nesting together on rocky islands in middle of rapidly flowing rivers. *Nest.*—Placed in a recess among rocks or sheltered by heather or scrub, always close to water and containing little matter beyond the down except a few bits of grass or twigs. Down rather light brown or drab with pale centres. Feathers (see Plate 91): also small, whitish, tipped pale brown present. *Eggs.*—Usually 6–7, but 5 and 8 recorded while B. Hantzsch gives 10 as maximum; pointed or blunt ovate, smooth, and slightly glossy; colour creamy or light cinnamon-buff. Average of 100 eggs (27 by E. Rey), 58·28×41·95. Max.: 62·4×43·5 and 57·3×44·5. Min.: 53·6×40·5 and 54×38·7 mm. Average weight (Rey), 3·52 grams (4·0 to 3·5 gr.). *Breeding-season.*—Some birds apparently lay at end of May, but most in June. *Incubation.*—By duck alone: drake remaining at hand when nest is isolated. Eggs imported from Iceland hatched in 31–32 days, probably some days less under natural conditions. *Fledging.*—Young apparently fed by duck at first, afterwards tended by her alone: drake only occasionally present. F. Faber gives " down " period as 40 days. Single-brooded. *F.C.R.J.*

**Food.**—During summer in Iceland feeds in rapids on insect larvæ, chiefly those of Ephemeroptera (*Ephemeridæ*), also Trichoptera (*Phryganeidæ*) and small Crustacea. Mollusca (*Littorina, Nerita* and in America *Mytilus*) are eaten: also said to take worms and fish-spawn, but records of winter food scanty. *F.C.R.J.*

**Distribution.**—*Great Britain.*—Very rare vagrant. Male found dead Filey (Yorks) autumn 1862. Two young males obtained, out of three seen, Farne Is. (Northumberland), Dec. 2, 1886 (J. G. Tuck, *Zool.*, 1887, p. 70, H Saunders, *P.Z.S.*, 1887, p. 319), a third obtained (G. Bolam, *Birds Northumberland*, etc., p. 401) is an adult male and date of its capture is rather uncertain (W. Percy *in litt.*). Adult male shot mouth of R. Ribble (Lancs) winter 1914–15 or 1915–16 (T. A. Coward, *Brit. B.*, xx, p. 25). A male identified with fair certainty near Is. of Berneray, Sound of Harris (O. Hebrides), Feb. 13, 1931 (S. W. P. Freme, *op. c.*, xxiv, p. 370). One recorded seen Whalsay (Shetlands), Mar. 5, 1933, is rather more doubtful (R. S. Bruce, *Scot. Nat.*, 1933, p. 147). Other old records are doubtfully authentic. *H.F.W.*

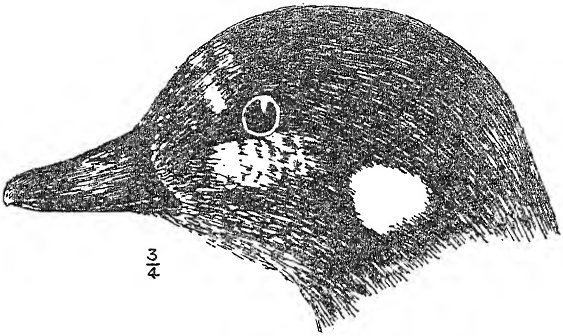
**Distribution Abroad.**—N. Holarctic region, but only from Baikalia east to Iceland. Typical race breeds in Iceland (resident), Greenland, and N.E. Canada

(Labrador to Newfoundland). Replaced by allied race (*H. h. pacificus*) from Baikalia to Anadyr, Kamtschatka, Kuriles, Sakhalin: also Pribilof and Aleutian Is. and from Alaska south to mountains of California and Colorado. Casual in Europe in Færoes, Spitsbergen, Norway, Sweden, Germany, Switzerland, Italy, Russia, possibly Bornholm, Estonia, and Poland; E. American birds winter south to Maine. W. American race has occurred in Korea and Japan, and winters south to California. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head* and *neck*) a band of black glossed deep blue from base of upper mandible along centre of crown to nape; triangular white or cream patch on lores (outlined with blackish-plumbeous at side next eye) extending on to fore-head and continued on crown as narrow streak running parallel for a short way with black mesial band; from fore-head to nape on either side of black mesial band, a cinnamon-rufous streak; narrow white streak under eye, often ill-defined; small white auricular spot, and on sides of neck an oval white patch, both usually outlined blackish-plumbeous; chin and throat blackish-plumbeous, rest of head and neck dark plumbeous; narrow white collar outlined black encircles lower-neck, in some incomplete on breast, broadest on upper-mantle where it almost joins; (*upper-parts*) from side of upper-mantle to upper-breast patch of white broadly outlined black; mantle and upper scapulars dark plumbeous, feathers with olive-brown bases sometimes imperfectly concealed; rest of scapulars more or less white bordered or tipped dark plumbeous, lower ones dark greyish-plumbeous; feathers of back and rump olive-brown shaded plumbeous towards tip; rump and upper tail-coverts plumbeous-black; on either side of rump at base of tail small white spot; (*under-parts*) upper-breast dark plumbeous, sides of lower-belly and flanks chestnut (sometimes some flank-feathers vermiculated black-brown); feathers of rest of breast, belly, and vent hair-brown edged dark plumbeous; under tail-coverts plumbeous-black; axillaries and under wing-coverts hair-brown, coverts edged dark plumbeous; *tail* black or black-brown, usually with grey bloom; *primaries* and coverts dark brown, paler on inner webs; *secondaries* dark brown all except first three with outer webs steel-blue, in some lights violet-purple, two innermost next *speculum* white bordered black on outer web, inner web more or less dark greyish-plumbeous; rest dark greyish-plumbeous, one usually with a white streak along shaft; *bastard-wing* and rest of *primary-coverts* sooty-brown edged plumbeous; *greater coverts* sooty-brown, some central ones with broad white mark or band towards tip preceded by band of steel-blue or violet-purple, innermost dark greyish-plumbeous; *median* and *lesser coverts* as mantle, sometimes one or two median coverts with a round or oval white patch towards tip. This plumage is acquired by a moult of body-feathers and innermost secondaries but apparently not tail, from Sept. onwards.

ADULT MALE. ECLIPSE.—The body-feathers are first moulted, followed by wings and tail July to Dec. (sometimes some winter-summer feathers are retained). Might be confused with 1st winter male, but has under-parts hair-brown. (*Sides of head* and *upper-parts*) fore-head, crown, nape, and sides of neck sooty-black or sooty-brown, feathers of centre of crown and sides of neck tipped blackish-plumbeous; feathers of white loral patch, patch under eye and auricular patch, tipped dusky; oval white patch on side of neck, white collar and patch across shoulder absent; rest of upper-parts sooty-brown or brown-black, feathers more or less tipped dark plumbeous; scapulars mostly sooty-brown tinged blackish-plumbeous; (*under-parts*) chin whitish, feathers tipped dusky; throat and fore-neck sooty-brown, in some tipped blackish-plumbeous, feathers with imperfectly concealed ash-brown bases; sides of body, flanks and under tail-coverts hair-brown or sooty-brown, in some tipped olive-brown, sometimes some feathers of sides of body and flanks suffused chestnut towards tip and vermiculated black-brown; rest of under-parts hair-brown, feathers with imperfectly concealed light bases ; new innermost *secondaries* not so broad at tip as in winter-summer and white of outer web bordered brown-black all round.

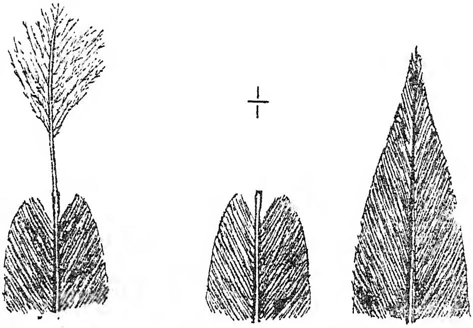
ADULT FEMALE. ECLIPSE.—(*Head, neck*, and *upper-parts*) upper-part of lores and chin dusky-brown, small white patch on either side of fore-head above eye, large one below eye, another on auricular region, feathers of all mostly tipped dusky ; throat and fore-neck drab-brown or hair-brown, feathers of fore-neck bordering upper-breast tipped golden-brown ; rest of head, neck, and upper-parts sepia or black-brown ; feathers of mantle, back, and rump edged blackish-plumbeous when fresh, scapulars warmer sepia edged buff-brown, lower scapulars edged blackish-plumbeous ; upper tail-coverts sepia or blackish-plumbeous edged cinnamon-brown ; (*under-parts*) upper-breast, sides of body, flanks, vent, and under tail-coverts sepia or drab-brown ; feathers of rest of breast and belly whitish more or less marked brown ; axillaries and under wing-coverts sepia, some coverts sometimes tipped white ; *tail* black-brown or sepia ; *primaries, secondaries*, and *bastard-wing* black-brown with blackish-plumbeous gloss, inner webs paler shading to dusky-brown ; *wing-coverts* black-brown shading to blackish-plumbeous at tip, one or two greater coverts occasionally with brownish-white spot towards tip. This plumage is acquired by complete moult July to Dec.



The Harlequin-Duck (*Histrionicus h. histrionicus*). Adult female.

ADULT FEMALE. SUMMER.—The body-feathers appear to be more or less completely moulted, but not tail or wings, April and May. Very like eclipse but *upper-parts* lacking sepia tone and more approaching clove-brown, feathers narrowly edged plumbeous olive-grey.

NESTLING.—Crown to below eye and centre of nape and whole of upper-parts, sides of body and uropygial tuft black-brown, long down-filaments tinged buff-brown ; small white patch from front of eye to fore-head, another on lores and one below eye ; small brownish-white spot on wing and another on side of back behind wing, both somewhat indistinct ; white spot on either side of centre of back above thigh not always well-defined ; rest of under-parts white tinged greyish on throat and sides of body.



The Harlequin-Duck (*Histrionicus h. histrionicus*). Tips of tail-feathers : on left of juvenile with down adhering, in centre same with down detached, on right of adult.

JUVENILE MALE AND FEMALE.—Like adult female eclipse but *upper-parts* lighter, more olive-brown, *wing-coverts* blackish olive-brown, instead of black-brown shading to blackish-plumbeous. (*Upper-parts*) nape and scapulars olive-brown ; upper tail-coverts olive-brown shading to buff-brown ; crown and mantle sepia, feathers shading to olive-brown or buff-brown at tip; back and rump blackish olive-brown ; lores dusky-brown ; patch above eye, another below eye (which does not usually extend on to lores) and small one on auricular region white; sides of neck light sepia or olive-brown; (*under-parts*) chin and throat dusky-brown; sides of body, vent, and under tail-coverts pale ash-brown or hair-brown, feathers tipped buff-white or buff-brown; flanks hair-brown shading to buff-brown; feathers of upper-breast ash-brown with broad subterminal drab-brown bars and fringed white or buff; remaining under-parts ashy-white, feathers mostly with subterminal dusky-brown bars; *tail-feathers* as adult female but with square tips and shafts projecting; *wing* as adult female but *primaries* and *secondaries* duller and browner with less blackish-plumbeous gloss; innermost secondaries shorter and narrower and *wing-coverts* blackish olive-brown; in some edged dark buff-brown.

FIRST WINTER. MALE.—Traces of a first winter plumage are acquired; *scapulars* dark plumbeous with no white, feathers of *sides of body* and *flanks* dark plumbeous with drab-brown bases, some *flank-feathers* suffused chestnut towards tip; *head* duller than in first summer, central streak dark plumbeous, no cinnamon-rufous on crown, area around and behind eye bordering crown, and nape olive-brown tinged plumbeous; *chin* and *throat* olive-brown tinged blackish-plumbeous; *sides of neck* as in first summer but duller. *N.B.*—Whether feathers of head are subsequently moulted in assumption of first summer or whether in some they are retained, I am unable to decide owing to lack of material.

FIRST SUMMER. MALE.—Easily distinguished from adult by duller upper-parts, retained juvenile feathers of breast and belly and dull speculum. (*Head* and *neck*) feathers of white patch at base of upper mandible and white streak on crown more or less tipped dusky-brown; a small white patch below eye, feathers tipped dusky and a white patch on auricular region as in adult; median blue-black band along crown duller; cinnamon-rufous streak ill-defined or absent; head and neck all round usually duller plumbeous than in adult; oval white patch on sides of neck smaller, feathers tipped dusky; white collar absent or incomplete, in some merely indicated at sides of neck and much narrower than in adult; (*upper-parts*) new mantle-feathers as in adult, scapulars with less white; back and rump as in juvenile; new upper tail-coverts and small white patch at root of tail as in adult; horizontal patch of white across shoulder usually narrower and often ill-defined; new feathers of *under-parts* and *tail* as in adult; *wing* as juvenile but sometimes new innermost *secondaries* and *median coverts* as adult are acquired (innermost secondaries as in adult eclipse). Most feathers of head and neck, some of mantle, scapulars, and upper tail-coverts, some of upper-breast, sides of body and flanks and under tail-coverts, in some all tail-feathers or central pair only, sometimes not tail, sometimes innermost secondaries and occasionally some median coverts are moulted from Oct. onwards. Only very forward birds fully acquire this plumage.

FIRST ECLIPSE. MALE.—As adult eclipse and only to be distinguished when some juvenile body-feathers are retained on under-parts or by juvenile wing, when not moulted.

FIRST WINTER. FEMALE.—Feathers of head and neck, some of mantle, scapulars, occasionally an upper tail-covert, in some a few feathers of upper-breast, sides of body and flanks, sometimes some under tail-coverts, some or all tail-feathers are moulted from Oct. onwards, but not apparently back and rump, lower-breast, belly or vent and not wings in material examined. New *body-feathers* and *tail* as adult eclipse female; owing to presence of retained juvenile feathers *upper-parts* are browner, with less blackish-plumbeous sheen than in adult female; *lower-breast, belly,* and *vent* as juvenile; *wing* as juvenile but innermost *secondaries* shorter and narrower and *wing-coverts* browner.

FIRST SUMMER. FEMALE.—Some birds may acquire a few feathers of summer dress, but all those examined had still retained juvenile lower-breast and belly; one (22/6/17, Schiöler coll.) was in full body-moult into 1st eclipse but still had some retained juvenile feathers on breast and belly, wing considerably worn and abraded.

MEASUREMENTS AND STRUCTURE.—♂ wing 200–209 mm., tail 88–107, tarsus 34–37, bill from feathers 25–28 (12 measured). ♀ wing 190–197, bill 24–26. Primaries: 1st narrow, pointed and about three-fourths longest primary-covert, 2nd and 3rd about equal and longest, 4th 6–8 mm. shorter, 5th 17–20 shorter, 6th 29–35 shorter; 3rd and 4th emarginated outer and 2nd very slightly inner, webs. Innermost secondaries short, longest shorter than 8th primary, tips slightly pointed. Scapulars of medium length and tapering to a point, in eclipse plumage with square or slightly rounded tips. Tail graduated, pointed, rather long, 14 stiff tapering feathers. Bill shorter than head, tapering, of nearly same height and breadth at base, frontal angle short and blunt, dorsal line straight and sloping to middle then nearly straight, at end decurved, nail large; a slight membranous lobe at edges of maxilla overhanging rictus; lamellæ entirely hidden.

SOFT PARTS.—Bill (♂ ad.) lead-blue, nail whitish, (♀ ad.) duller; legs and feet (♂ ad.) pale bluish, webs dusky, claws bluish, (♀ ad.) duller; iris (ad. ♂) reddish-brown, (ad. ♀) brown. [*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Dark plumbeous upper-parts, head and body with numerous white patches and steel-blue speculum distinguish adult males, brown of adult female and juveniles with white marks on head and small size distinguish them from other British ducks. *H. h. pacificus* (N.E. Siberia to western N. America) has stronger bill, higher at base and usually broader, but females cannot always be distinguished with certainty. [*A.C.M.*]

## Genus **POLYSTICTA** Eyt.

POLYSTICTA Eyton, Cat. Brit. B., p. 58 (1836—Monotype *P. stelleri*).[1]

In style of coloration more like *Somateria*, but bill entirely different. Nail as in *Histrionicus*, also ill-defined, but bill longer than in latter, at least as long as tarsus, almost of equal width, not tapering. Cutting edge of upper mandible not straight and distal half with soft-skinned edge, in dried skins generally folded inwards. Tail also 14 rectrices. In male feathers of head shorter and somewhat scale-like, on nape a brush-like sort of crest. Inner secondaries in male greatly modified. Sexes very different. One species, arctic regions of Northern Hemisphere.

*PLATES 90 and 91.*

## 336. STELLER'S EIDER—Polysticta stelleri (Pall.)

ANAS STELLERI Pallas, Spicilegia Zool., fasc. vi, p. 35, pl. 5 (1769—Kamtschatka).
*Somateria stelleri* (Pallas), Yarrell, iv, p. 468; Saunders, p. 463.
*Polysticta stelleri* (Pall.), Pract. Handb., ii, p. 352.

**Habitat.**—For breeding purposes frequents tundra lochs and pools, but chief haunt of the largely (if not entirely) non-breeding parties on Varanger Fjord in summer is shallow bay at mouth of small river on low-lying coast. In winter, however, it prefers "the roughest, deepest, and rockiest coastlines" (Phillips). *B.W.T.*

**Field-characters and General Habits.**—*Black and white pattern of drake, with white head, dark (greenish) patch on nape, and chestnut-buff breast and belly shading to paler on flanks*, is quite distinctive. As seen at rest whole hind part of body and wings are black with crescentic white mark on wings; throat, collar, and centre of back also black. The long scapulars which curve over white fore-wing are banded lengthwise black and white. In flight white fore-wing is conspicuous; primaries blackish, speculum purple bordered white behind and more narrowly in front. A neat, compact-looking little duck very different in build and outline from heavy and coarse-looking Eider. Rather long and pointed tail usually inclined upwards at moderate angle. In case of female question of confusion with true eiders hardly arises, as apart from *much smaller size and darker, more uniform colouring, profile of head and bill is quite different and more like a typical duck.* Head is slightly paler than rest and more inclined to rufous; white wing-bar fairly prominent, with another less distinct in front of it, and purple speculum between them may be visible as such in good light. Eclipse is assumed rather late: in party seen by writer at beginning of July several drakes were in practically full plumage except for tinge of brown on head and loss of most or all of the black and white scapulars, so that whole sides above rufous flanks appeared white; others had head in various stages of becoming completely brown and much brown was appearing on sides of body, the final result being evidently much like female apart from wings. The young birds are much like females and during first winter and spring the males only make very incomplete approach to mature plumage. Bill and legs of adult male bluish-grey, duller in female. Total length *c.* 18 ins.; body *c.* 12 ins.

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[1] Some authors have rejected *Polysticta* on account of *Polisticte* Smith, 1836, but apart from the differences in the two names, *Polysticta* appears to have been published in April and *Polisticte* in June, 1836.

Most observers have found Steller's Eider wild and shy, but the flock seen in Norway was not so at all, refusing to fly in spite of arm-waving, shouting, and even stone-throwing, though not far from shore. Flight is swift, with sound similar to that made by Goldeneyes, but very much louder (W. Percy); rises as easily as a surface-feeding duck (H. M. S. Blair). Within its ordinary range often occurs in huge and densely-packed flocks outside breeding-season and even as early as end of June. Stated to be addicted to swimming in single file. Feeds by day. The Norwegian birds partially opened wings as they dived and also "up-ended" in shallows like surface-feeding ducks. Several left water on one occasion to rest on exposed rocks. *B.W.T.*

**Voice.**—Note of female is "growling" noise like that made by female Wigeon (W. Percy). Male's is low croon, harder, but much less in volume than Common Eider's (H. M. S. Blair). *B.W.T.*

**Display and Posturing.**—A characteristic feature of courtship is manner in which tawny lower breast of male is displayed, the bird rising half out of water as he follows female (H. M. S. Blair). M. Garnett observed "little bowing motion" accompanying this action. *F.C.R.J. & B.W.T.*

**Breeding.**—Little definite recorded, but breeds in hollow on tundra among mosses and grass and is said to have been found nesting among rocks on coast. *Nest.*—Lined with grass, moss, and lichens mixed with down and feathers. Down very dark sooty-brown, almost formless, with an occasional small white spray here and there. Feathers, when present, are said by A. C. Bent to be from the breast and characteristic (see Plate 91). *Eggs.*—7–8 as a rule, 6–10 on record: blunt ovate, but rather variable, light yellowish-olive or olive-buff: some with slight greenish tinge: surface dull. A. C. Bent gives average size of 75 eggs as $61{\cdot}4 \times 42$. Max.: $70{\cdot}5 \times 45{\cdot}5$ and $66{\cdot}9 \times 47{\cdot}1$. Min.: $55{\cdot}5 \times 40{\cdot}5$ and $59{\cdot}2 \times 37$ mm., agreeing closely with average of 30 eggs by writer, 62·1×40·7 mm. Average weight (H. Goebel), 4·62 grams (5·2 to 3·7 gr.). *Breeding-season.*—From about mid-June onward in Alaska: mostly towards end June and early July. *Incubation.*—By female alone: male in vicinity (A. T. v. Middendorff) but in Alaska males are said to leave early for south. Period not ascertained. *Fledging.*—Only females seen with young. Single-brooded. *F.C.R.J.*

**Food.**—Almost entirely animal matter, but only detailed information that of R. Collett, who records Mollusca (*Littorina*, *Lacuna*, *Trophon*, *Margarita*, *Pleustes*, *Anonyx*, *Podocerus*, and *Buccinum*); also species of Gammaridea and *Amphithöe*. J. G. Millais includes mussels, young fish, and spawn: Murdoch gephyrean worms. *F.C.R.J.*

**Distribution.**—*England.*—Two. Nearly adult male Caistor (Norfolk) Feb. 10, 1830 (Yarrell, *Proc. Z. Soc.*, 1831, p. 35). Young male off Filey Brigg (Yorks) Aug. 15, 1845 (R. J. Bell, *Zool.*, 1846, p. 1249). *H.F.W.*

**Distribution Abroad.**—N.E. Palæarctic region. Breeds in arctic Siberia from Yalmal to Tchutchiland: also New Siberian Is. and in Alaska. Suspected of breeding in N. Finland and E. Finmark, but evidence insufficient.[1] Winters on coasts of N. Scandinavia and N. Pacific (Aleutian and Commander Is., Kuriles, S. Alaska). Has occurred south to S. coast of Baltic: accidental Quebec, Greenland, N. France, Germany, Denmark, Heligoland, and in Japan. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head, neck,* and *upper-parts*) head and upper-neck silky-white; across hinder-crown patch of light emerald-green with small black patch glossed violet-purple on either side; lores and fore-head more or less suffused pale emerald-green; irregular black patch round eye; chin, throat, collar encircling lower-neck, centre of upper-mantle, rest of mantle, back, rump, and upper tail-coverts black more or less glossed violet-purple or blue-black; sides of upper-mantle white; short upper scapulars mostly white, some with inner webs more or less black, some with violet-purple shaft-streaks, long tapering ones with broad outer web violet-purple, in some lights sapphire-blue, narrow inner web white, lower scapulars sepia or ash-brown more or less glossed violet-purple with irregular white shaft-streaks, and narrowly edged white, some with one web more or less white; (*rest of under-parts*) below black collar, fore-neck encircled by narrow white collar continuous with sides of upper-mantle; upper-breast cinnamon-buff deepening to orange-cinnamon on lower-breast; a purplish-black patch on sides of breast; sides of body and flanks cinnamon-buff; middle of breast sepia shading to black-brown on belly, vent, and under tail-coverts; axillaries and under wing-coverts white; *tail-feathers* sepia, when fresh glossed violet-purple, outermost pair in some with small white mark towards tip; *primaries* sepia shading to black-brown on outer webs and tips, inner primaries sometimes edged white; *secondaries* sepia with broad white tips, paler and shading to white on inner webs, all except outer one with outer webs glossed violet-purple or sapphire-blue, innermost with inner webs mostly white and with white shaft-streaks; *primary-coverts* sepia; *bastard-wing* and rest of primary-coverts sepia more or less edged white, rest of *wing-coverts* white. Very little moulting material examined. *N.B.*—There is considerable individual variation in colour of under-parts.

ADULT MALE. ECLIPSE.—(Not examined.) A. C. Bent gives *head* and *neck* bistre or "mummy-brown" with only a trace on hind-neck of purplish-black collar; *mantle* dull black; *scapulars* and *flanks* clove-brown; *upper-breast* barred dusky and brown; rest of *under-parts* and *wings* as winter-summer.

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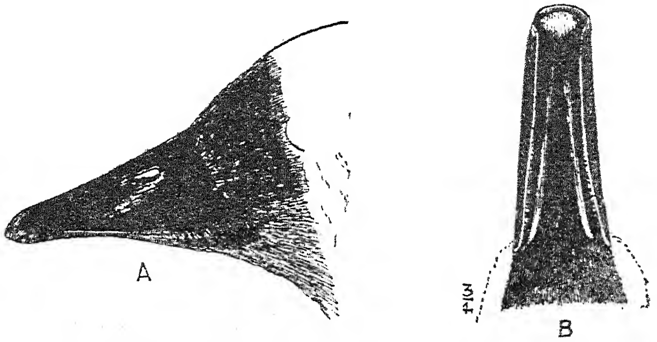
[1] Males also seen in 1929 on Lofoden Is. (J. Schinz), but no proof of breeding.

ADULT FEMALE. WINTER AND SUMMER.—(*Upper-parts*) crown and nape dark sepia or black-brown, feathers with more or less concealed pink-buff bars; mantle, back, and rump brown-black more or less barred pink-cinnamon, feathers of mantle edged same; scapulars black-brown narrowly edged cinnamon-brown, lower ones with outer webs glossed blue-black; upper tail-coverts brown-black narrowly edged cinnamon-brown; (*sides of head*) lores, cheeks and sides of neck pink-buff, feathers tipped and barred sepia; (*under-parts*) chin, throat and fore-neck paler, feathers more or less barred and tipped dusky and with whitish bases imperfectly concealed; feathers of upper-breast with broad brown-black V-shaped marks and bars and broad tawny fringes; sides of body and flanks sepia or black-brown, feathers edged tawny and with occasional pink-buff bars; rest of breast, belly, vent, and under tail-coverts warm sepia or brown-black; axillaries and under wing-coverts white but coverts at edge and bend of wing with sepia centres; tail sepia apparently without gloss; *wing* as male but *speculum* less developed, outer *secondaries* sepia with no steel-blue gloss, innermost secondaries with inner webs sepia and more or less frosted with silvery-grey towards tip or with shaft-streaks of same; *greater coverts* sepia, middle ones (in some outer ones) tipped white; *median* and inner greater coverts sepia or black-brown more or less faintly edged cinnamon-brown; *lesser coverts* same but edged or barred buff. ECLIPSE.—(Not examined.)

NESTLING.—Upper-parts and sides of body dark brown; lores lighter; line above and below eye whitish, behind eye a narrow buff-white line; under-parts grey-brown, darker on sides of face, fore-neck and under tail-coverts, lighter on chin; frontal and loral feathering as in adult.

JUVENILE. MALE AND FEMALE.—Like adult female but *upper-parts* with narrower and paler edges, *under-parts* much lighter. (*Upper-parts*) crown sepia, feathers more or less barred and tipped light buff; nape dark ash-brown; rest of upper-parts black-brown, feathers narrowly tipped buff; (*under-parts*) sides of face and neck, chin, throat, and fore-neck buff; feathers more or less spotted and tipped dusky-brown and with ill-concealed ash-white bases; rest of under-parts ash-white, feathers with broad subterminal sepia bars and edged cinnamon-buff; *tail* as in adult; *wing* as in adult female but violet-purple *speculum* ill-defined, outer and most of middle *secondaries* (in some all) black-brown or sepia lacking violet-purple gloss, secondaries with much narrower white tips than in adult female and innermost without or with only an indication of silvery-grey shaft-streaks; *greater coverts* with narrower white tips; *median* and *lesser* as in adult but with light or warm buff edges.



Steller's Eider (*Polysticta stelleri*).—A. Adult female. B. Adult male bill from below.

FIRST WINTER. FEMALE.—(Male not examined.) Apparently like adult female but *nape* as juvenile but apparently darker, new feathers of *mantle* as juvenile but more broadly edged pink-buff; new *upper tail-coverts* brown-black; *fore-neck* as juvenile; *wing* as juvenile. Feathers of head, mantle, scapulars, rump, and upper tail-coverts and all under-parts, tail but not wings, are moulted in autumn and winter. *N.B.*—In the one bird examined (Nov.) feathers of neck all round appeared to be those of juvenile but doubtless would be renewed eventually.

MEASUREMENTS AND STRUCTURE.—♂ wing 209–217 mm., tail 80–90, tarsus 34–37, bill from feathers 36–40 (12 measured). ♀ wing 210–215, bill 37–40. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 2nd longest, 3rd equal or 2–5 mm. shorter, 4th 8–12 shorter, 5th 19–25 shorter, 6th 30–36 shorter; 3rd emarginated outer, 2nd slightly inner webs. Innermost secondaries only slightly longer than secondaries, falcate or sickle-shaped in both sexes but not in juvenile, longest shorter than 7th or 8th primaries. Scapulars long, tapering and falcate in male. Tail cuneate with 14 stiff, pointed feathers. Bill slightly higher than broad at base, compressed and tapering towards tip (which is not decurved) with a broad, depressed and indistinctly defined nail; maxillary tomium convex basally and sinuated terminally, edges of maxilla turned inwards against, and partially enclosing, lower mandible. Feathers of head in male soft and silky, those on hinder-crown slightly elongated to form a tuft.

SOFT PARTS.—Bill (ad. ♂) blue-grey, (ad. ♀) dusky-blue; legs and feet (ad. ♂) blue-grey, claws yellowish-grey, (ad ♀) dusky-olive; iris dark brown.

[*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Adults distinguished by violet-purple or sapphire-blue speculum bordered above and below with white, and falcate innermost secondaries; in all plumages shape of bill (see structure) and absence of frontal angles are good diagnostic characters. [*A.C.M.*]

## Genus SOMATERIA Leach

SOMATERIA Leach, Ann. Philosophy, xiii, p. 61 (Jan. 1819—Monotype: *Somateria mollissima*).[1]

Lobe of hind-toe very wide (more than half length of toe). Bill almost straight, about as long as head, high at base, nail occupying whole width of tip of bill. Nostrils about in middle of bill. Feathering of fore-head extending in a point to culmen, that of sides of head reaching in a long point to nearly middle of bill. Inner secondaries in male elongated, sickle-shaped. Tail short, rounded, 14, sometimes 16, rectrices. 3rd primary longest. Large birds, sexes very different, inhabitants of sea-coasts. Two species, one in several subspecies. Northern shores.

*PLATES 81, 87a, and 90.*

## 337. THE COMMON EIDER—Somateria mollissima mollissima (L.)

ANAS MOLLISSIMA Linnæus, Syst. Nat., ed. x, i, p. 124 (1758—N. Europe).
*Somateria mollissima* (Linnæus), Yarrell, iv, p. 457; Saunders, p. 459.
*Somateria mollissima britannica* Millais, Brit. Diving Ducks, ii, p. 2 (1913—British Isles).
*Somateria mollissima mollissima* (L.), Pract. Handb., ii, p. 356.

**Habitat.**—A thoroughly maritime species. In breeding-season frequents chiefly low-lying coasts and islands with both rocky and sandy shores; also locally and rarely resorts to islands in rivers and lakes some miles from sea. Outside breeding-season spends its time, often well out to sea, though also frequently close inshore, off rocky, storm-swept and low-lying, sandy or muddy coasts, especially where mussel-banks and reefs afford good feeding, and is only of accidental occurrence on inland waters. *B.W.T.*

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[1] This reference antedates both editions of Ross's *Voyage of Discovery*. *H.F.W.*

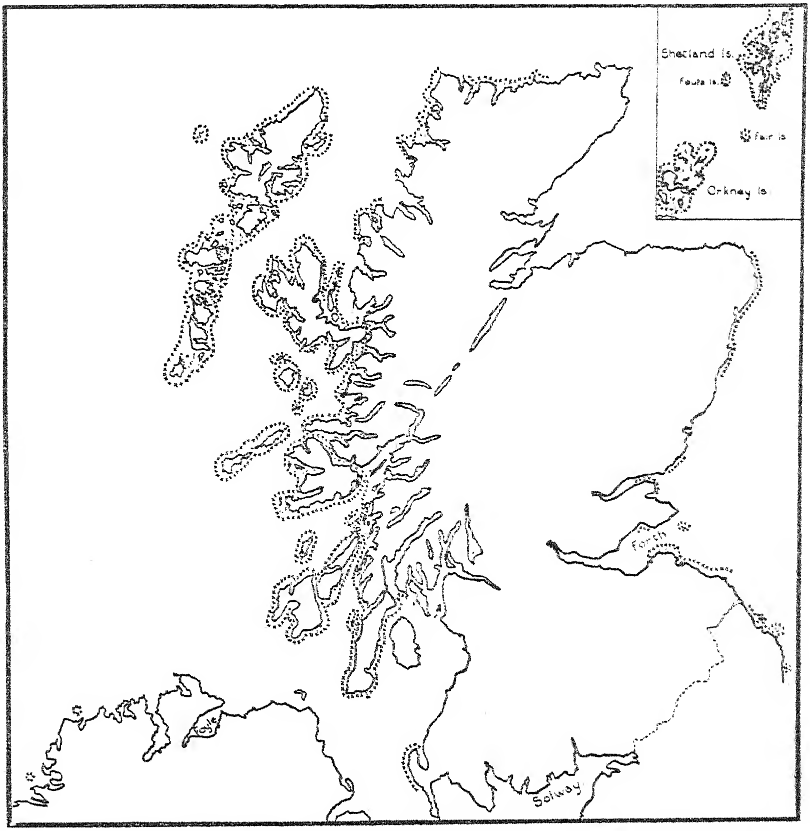
**Field-characters and General Habits.**—Bold contrast between *black crown, flanks, belly and tail region and predominant white of rest of plumage* mark male at once. Breast more or less strongly tinted pinkish, green patches on sides of head and nape, white patch at sides of rump. The white inner secondaries are sickle-shaped and curve down over closed wing. Black crown-patch divided at back by median white band. A longer-bodied bird than typical diving ducks; tail often somewhat cocked up. Female is warm brown, streaked, barred and mottled with blackish, and is recognized by heavy build and peculiar shape of head, *rather flat profile of fore-head being continued in almost a straight line by that of broad-based bill.* At close quarters extension of facial feathering over sides of upper mandible is also noticeable. In flight, which is generally low down over water, bulky form and short, thick neck are very noticeable. In addition to white areas already described whole fore-wing of male is white, contrasting with black quills in flight, while brown female shows only two rather obscure buffish wing-bars. Drake is in full plumage from about Nov. or Dec. to late June or early July. Though eclipse is not really complete till Aug. it appears to all intents and purposes so in the field by about mid-July; bird is then *dingy blackish except for white on wing, which remains as in winter and shows as white patch on sides.* A pale crescentic band curving up from base of bill over sides of crown is developed to varying extent and may be rather conspicuous. This plumage, being entirely different both from female and from male at other seasons, is liable to puzzle inexperienced observers, while transitions between it and full plumage and between the several plumages of immature birds produce a singular variety of patchy and mongrel-like patterns. Young birds mature very slowly, plumage of males being approximately complete only in third winter and not absolutely so until fourth. For details, see "Description," but for field purposes following may be taken as outline of change:—Juvenile: resembles female, but darker and more uniform on upper-parts, a light band curving over eye region to back of crown. First winter and spring: head becomes darker at first (pale mark much as before) and in course of period a variable, often considerable, amount of white comes in, especially on breast, but not on wings; more or less black acquired on flanks. (State of plumage reached at given date varies enormously in different birds.) Second winter and spring: much like adult except for black edges of sickle-shaped secondaries. Total length *c.* 23 ins.; body *c.* 15 ins.

Flight usually a foot or so to a few feet above water, strong, steady and direct, though it rises in usual laboured manner of diving ducks. Parties generally fly in single file like scoters and mergansers. Walks with slow, rolling gait and erect attitude, but carriage may be more horizontal when at rest. In spring and autumn (much less in winter) comes to land very freely and spends much time resting and preening on rocks, sandbanks or ice. According to L. Lloyd roosts regularly on rocks in summer, but the winter flocks normally do so well out to sea. Swims with head rather retracted. Often present on suitable coasts in great numbers in winter, but they tend to scatter in small groups, though close flocks of a hundred or more may be seen at times and on migration huge gatherings are recorded. Feeds by diving, and Phillips considers 10–20 ft. the ordinary depth, putting the maximum at 25–35 ft., at which depth Millais states that they can feed without difficulty. J. M. Dewar did not get evidence of greater depth than *c.* 16 ft. and found most dives (51%) were in 6–12 ft.; longest recorded dive was 47 secs. Wings are often partly opened as bird dives, and a number of observers have proved that it uses them under water, holding them clear of sides and moving them with short jerks, though opinions differ as to how regularly it does this; Millais says when much frightened or in heavy currents. In addition to diving will also feed in shallow water by merely dipping head, but does not "up-end." Often very tame and confiding at breeding-places, though shyer in winter. *B.W.T.*

**Voice.**—Note of male is a low crooning or cooing sound rendered "ah-ōō," "ah-ee-ōō," etc., or "cōō-rōō-uh," chiefly heard in spring, but also at other times and audible for a considerable distance; varies a good deal in tone and volume, often rising and falling in a "conversational" way as heard from parties. Female has hoarse, grating "kr-r-r-r" like other diving ducks and has also a display-note "cōō-rōō" (H. Boase). *B.W.T.*

**Display and Posturing.**—Display is not elaborate. Drakes swim with head held high and neck stiff, uttering crooning call with upward jerk of bill. Bill and head movements are characteristic. Details vary, but most complete performance is when head is drawn rigidly down, bill resting on breast, head then raised till it points vertically upwards, when it may or may not be opened to emit display-note. After this head is occasionally jerked backwards short distance, still held rigidly, and then returned to normal. Sometimes motion of head is arrested for a moment in elevated position and then it is jerked down again with upthrust of rear portion of body. Often drakes rise up in water in Mallard-like fashion, but movement may be continued in upthrow of bill as note is uttered, with downward jerk at end (C. W. Townsend (American race), H. Boase). Female is not purely passive, but will follow male about, assuming coition posture, calling, and pushing against him (Millais), head often held high and stiff as in drake and bill tossed up at moment of calling (Boase). Boase found display comparatively rare till May, a curiously late date, and observed a good deal on land as well as on water and saw drakes performing to drakes as well as to females. *F.C.R.J. & B.W.T.*

**Breeding.**—In British Is. nests chiefly on islands off the coast, or on sandhills and country near the sea-shore, but in Outer Hebrides and Shetlands also on hills and lochs inland. In Iceland colonies may be found on islands in rivers several miles from the sea. Breeds in colonies, sometimes in great numbers abroad where protected, but isolated or scattered nests may also be found. *Nest.*—Made by duck, often accompanied by drake when seeking site, but not later (E. Miller): mere hollow, sometimes in open, at other times sheltered by rocks or inside recess of building or rocks: and often concealed by growing vegetation. Foundation of grass, sea-weed, etc., plentifully lined with down and feathers. Down rather light greyish-brown, with ill-defined light centres, and rather lighter tips. Brown feathers barred black characteristic (see Plate 87A). *Eggs.*—Most nests contain 4–6, 3 minimum, but all numbers up to 10 have occurred, 14–19 certainly represent produce of more than one duck, and as nests are often close together, there may be laying in wrong nests. Colour normally pale olive or greenish-grey to buff, sometimes distinctly green and rarely deep blue: often marked with "oil" spots: shape blunt ovate or elliptical: shell smooth and gloss slight. Average of 100 British eggs, 77·14×50·71. Max.: 87·8×52 and 82·5×54·5. Min.: 70·3×49 and 75·6×47·5 mm. Average weight (H. Goebel), 8·58 grams (11·4 to 6·4 gr.). *Breeding-season.*—From mid-May to June in Northumberland: often not till June in N. Scotland. *Incubation.*—By duck alone: has been observed to take no food (in confinement) and leaves nest only for short times. Period 27–28 days: drake remains near by in case of isolated nests. *Fledging.*—Young taken to water as soon as dry by duck: chicks independent, but attach themselves to and are tended by nearest duck. Single-brooded. *F.C.R.J.*



Map to show the Breeding Distribution in the British Islands of the Common Eider.

Coasts are outlined, and islands surrounded, with crosses where the bird now breeds regularly in N.E. England, Scotland and N.W. Ireland. No account has been taken of sporadic or uncertain records.

**Food.**—Investigated by W. Evans (42 stomachs) and W. E. Collinge (24). Latter estimates animal matter at 95·5%, chiefly Mollusca (51·5%) including *Loligo*, *Buccinum*, *Nassa*, *Purpura*, *Cypræa*, *Turritella*, *Littorina*, *Lacuna*, *Rissoa*, *Nerita*, *Trochus*, *Patella*, *Helcion pellucidum* (286 in one bird), *Limnæa*, *Pecten*, *Mytilus* (74 in one crop alone), *Anodonta*, *Cardium*, *Venus*, *Mactra*, *Tellina*, *Donax*, *Mya*, *Saxicava*, *Solen* (up to 8–10 ins. long): Crustacea (24·5%) include crabs (*Cancer*, *Carcinus*, *Portunus*, and especially *Hyas*), Isopoda (*Idotea*) and Cirripedia (*Balanus*): Echinodermata (*Asterias*, *Ophiothrix*, *Echinus*): also Coelenterata (*Actinia*) and insects, chiefly Coleoptera (Hydradephaga and Geodephaga): entrails of fish thrown overboard and 4·5% of vegetable matter, seaweed (*Ulvaceæ*), etc. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident. Resident and breeds in *England* coast of Northumberland, Farne, Holy, and Coquet Is. only. In *Scotland* on E. side from Berwick to Aberdeen, but does not breed Banff, Moray, Nairn (possibly breeds), E. Ross and E. Sutherland and E. Caithness, and only scarce winter-visitor on this portion of E. coast; on N. coast breeds parts N. Sutherland; breeds plentifully Orkneys, Shetlands and O. Hebrides, and most I. Hebrides (especially Colonsay and increased Skye); on W. coast common parts Argyll, and now breeds fairly commonly (formerly scarce winter only) in N.W., and also breeds locally Firth of Clyde, Wigtown (since 1920) and has bred Kirkcudbright (1908). In *Ireland* has bred on one island (W. Donegal) since 1912 and now breeds on another of same group as well as on one off N.W. Donegal. In winter scarce visitor south of breeding range but occurs irregularly in small numbers all coasts Oct. (exceptionally Sept.) to March, exceptionally April and May and even between June and Aug. Twenty recoveries of ringed adult and young British birds indicate that these are to a considerable degree sedentary. *H.F.W.*

**Distribution Abroad.**—Holarctic region. Typical race breeds in Jan Mayen, Iceland, Færoes and Norway, Finland and N. Russia (S. Novaya Zemlya, Waigatz, ? Kolguev, Dolgoi, and White Sea district), but some writers recognize 2–3 races. In south to France (Brittany), Holland (Vlieland), Sylt, and Denmark: also on Baltic Is. Replaced by allied race (*S. m. borealis*) in Spitsbergen, Franz Josef Land, Greenland, and N.E. Canada, and by other races in E. Canada and Maine (*S. m. dresseri*) and from N.E. Siberia to Alaska and Mackenzie (*S. m. v-nigrum*). Typical race occurs south to N. France and S. coasts of Baltic. Casual in Azores, Portugal, N.E. Spain, S. France, Switzerland, Italy, Yugo-Slavia, and in middle Europe. American races winter in Gulf of St. Lawrence (*dresseri*), casual in E. States and Bering Sea (*v-nigrum*); occasional Kansas. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head*, *neck*, and *upper-parts*) crown to eye and band along top of loral feathering black glossed violet-purple; cream-white mesial streak down crown, in some tinged pale green; upper-part of nape and patch on side of neck emerald-green, intersected by white streak on side of neck; rest of head, neck, mantle, scapulars, back, and sides of rump white (in some mantle and scapulars cream), occasionally a black V-shaped mark on chin and throat, some feathers of back with imperfectly concealed ash-brown bases; centre of rump and upper tail-coverts black; (*under-parts*) upper-breast pale pinkish-cream, feathers bordering lower-breast tipped black; sides of body, flanks, and under tail-coverts black; remaining under-parts brown-black; axillaries white sometimes mottled dusky; under wing-coverts white; *primaries* and *secondaries* black-brown, inner webs paler, secondary next innermost with inner web and tip mostly white and next with irregular white patch towards tip; innermost falcate secondaries and coverts white; all *primary-coverts* and bastard-wing sepia, latter tipped white; *greater coverts* as secondaries, one next innermost white mottled dusky and tipped black; *median* and *lesser coverts* white. This plumage is acquired by a body-moult Aug. to Dec. *N.B.*—When fresh some feathers of head, neck and upper-breast have black-brown tips; in summer emerald-green of head and pink of upper-breast become faded.

ADULT MALE. ECLIPSE.—The body-feathers, but not lower-breast, belly, vent nor back (usually sides of rump), are first moulted June to Aug. While in eclipse back, lower-breast, belly, vent, tail, and wings are renewed, moult of these areas in their later stages synchronizing with assumption of winter plumage but sometimes moult of lower-breast, belly, and vent does not appear to start before commencement of post-eclipse moult. (*Head* and *neck*) fore-head, crown, lores, cheeks, and sides of upper-neck brown-black or dark sepia (feathers of fore-head sometimes more or less barred or tipped buff, those of rest of head tipped white); irregular buff or white streak through eye, feathers marked brown-black; black streak from upper-side of lores to eye; chin, throat, and rest of neck sooty-brown or light sepia, feathers with imperfectly concealed brownish-white bases; (*upper-parts*) mantle and scapulars sooty-brown or light sepia, some feathers of centre of mantle sometimes with distal halves more or less white and broadly tipped black, scapulars sometimes with outer webs or centres of feathers towards tip more or less white; back as adult winter-summer; rump brown-black; sides of rump and upper tail-coverts sooty-brown; (*under-parts*) feathers of upper-breast bordering lower-neck sooty-brown, sometimes tipped buff and often with irregular white central marking, rest of feathers with distal halves white, broadly tipped black, some with terminal buff markings and barred blackish; sides of body, flanks, and under tail-coverts sooty-brown; rest of under-parts as adult winter-summer. *N.B.*—Sometimes some worn white feathers are retained on head, neck, mantle, and scapulars.[1]

ADULT FEMALE. WINTER AND SUMMER.—(*Head* and *neck*) fore-head and crown streaked black-brown, feathers edged pink-cinnamon; nape, cheeks, side of neck, chin, throat, and fore-neck warm buff or pink-cinnamon, more or less narrowly streaked black-brown, in some a light buff streak, feathers narrowly streaked black-brown, through eye; rest of *upper-parts* brown-black, feathers edged cinnamon-buff or tawny, scapulars notched and with broad edges of same; (*under-parts*) upper-breast, sides of body, flanks, and under tail-coverts cinnamon-buff with black-brown bars more or less concealed on upper-breast, broader and more numerous on sides of body and flanks; rest of under-parts brown, feathers with imperfectly concealed pale drab bases (sometimes with darker bars and irregularly barred and tipped buff); axillaries white, sometimes mottled dusky-brown; under wing-coverts pale sepia more or less tipped white, some ashy-white; *tail, primaries,* and their coverts as male; *secondaries* warm sepia, paler on inner webs, outer webs narrowly tipped white, innermost secondaries edged tawny; *greater coverts* as secondaries but white tips more extensive; *primary-coverts* pale sepia narrowly tipped buff; innermost *greater, median,* and *lesser-coverts* as mantle but lesser and innermost median with narrower buff edges. This plumage is acquired by a body-moult Sept. to March. *N.B.*—Some feathers of head and neck may be renewed in spring but otherwise no moult.

ADULT FEMALE. ECLIPSE.—Feathers of head, neck, mantle, scapulars, some of back, rump, and upper tail-coverts and upper-breast are first moulted, followed by wings, tail, and rest of body-feathers in Aug. and Sept. *Upper-parts*, especially head, are much darker than in winter and summer. Crown brown-black; nape ash-brown, feathers more or less edged buff; mantle, scapulars, and new feathers of back and rump and upper-breast with paler and narrower edges than in winter-summer; *cheeks* and *sides of neck* thickly streaked black-brown; (*under-parts*) chin and throat ashy-white or buffish narrowly streaked black-brown; sides of body and flanks dark ash-brown; under tail-coverts paler, tipped buff and with a subterminal black-brown mark.

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[1] In Plate 90 the adult male eclipse should show some white on wing.

NESTLING.—Crown, nape, upper-parts, and sides of body sepia or black-brown, long down filaments tinged buff-brown at tip; broad buff eye-stripe from lores to hinder-crown, below which a black-brown streak encircling eye and continued to nape (these streaks in some obsolete); lores and cheeks sepia; chin and throat brownish-white, in some a white streak on either side of chin; remaining under-parts brownish-white darker on upper-breast, dusky-brown on belly and vent. Loral and frontal feathering as adult.

JUVENILE. MALE.—Easily distinguished from adult female by darker upper-parts, feathers with narrower buff edges, and under-parts hair-brown, feathers narrowly tipped buff. (*Upper-parts*) crown black-brown, feathers of fore-head edged buff; broad whitish band from point of frontal angle above eye to hinder-crown, feathers narrowly streaked black-brown; nape hair-brown or dark ash-brown; rest of upper-parts black-brown, feathers more or less shading to blackish subterminally and edged buff, edges narrower and less defined on back; feathers of sides of rump barred buff and blackish; (*under-parts*) cheeks and sides of neck dark hair-brown (chin, throat, and fore-neck paler) narrowly streaked black-brown, streaks sometimes ill-defined; feathers of upper-breast barred towards tips black-brown and whitish or buff; sides of body, flanks, and under tail-coverts sepia, feathers barred black-brown (in some barred buff) and tipped buff; remaining under-parts hair-brown, feathers with ill-concealed light drab bases and tipped light or warm buff; axillaries and under wing-coverts as adult female; *tail* as adult female but tips square and shafts projecting; *wing* as adult female but *secondaries* black-brown, inner webs hair-brown, white tips absent or at most ill-defined, innermost secondaries black-brown, sometimes narrowly edged buff; *wing-coverts* hair-brown mostly tipped buff, sometimes shaded or barred black-brown towards tips.

JUVENILE. FEMALE.—As male but secondaries lighter, innermost shorter and less sickle-shaped, feathers of back and rump often with broader buff edges.

FIRST WINTER. MALE.—(*Head* and *neck*) fore-head and crown snuff-brown with black bars more or less concealed, feathers down middle of crown to nape heavily barred black with a bluish sheen; nape black-brown, feathers more or less tipped buff; from top of lores through eye light buff or whitish streak, feathers tipped or streaked blackish; rest of loral feathering, cheeks and sides of neck brown-black, some feathers tipped and barred buff; chin, throat, and fore-neck sooty-brown, feathers with ill-concealed ashy-brown bases; new black-brown *scapulars* more or less edged snuff-brown are acquired; rest of plumage as in juvenile. Feathers of head, neck, and some body-feathers are moulted from Sept. FIRST SUMMER.—Acquires a certain amount of white plumage of adult from which easily distinguished by retained juvenile under-parts and wing-coverts. First winter and first summer plumage are not definitely separable, moult being more or less continuous. (*Upper-parts*) fore-head and crown as first winter; from top of lores above eye to hinder-crown a broad blackish streak glossed bluish, some feathers tipped buff; in some sides of hinder-crown white suffused emerald, feathers tipped blackish or buff; nape and new feathers of mantle and scapulars white, some tipped or mottled blackish; new feathers of rump blackish, sides of rump sometimes intermixed with white; upper and under tail-coverts black; (*sides of head* and *under-parts*) lores dusky-brown; cheeks, sides of neck, chin, throat, and fore-neck more or less white, feathers tipped blackish or dusky-brown, patch on sides of neck sometimes suffused palest emerald; upper-breast white or pale pinkish-cream, feathers sometimes more or less narrowly tipped blackish and buff; new feathers of sides of body and flanks brown-black, some narrowly tipped snuff-brown; rest of under-parts as juvenile but more or less intermixed with new brown-black feathers; *tail* as adult; *wing* as juvenile. The body-feathers, not all feathers of mantle, scapulars, back or rump, usually few feathers of under-parts, in some all tail, in some central pair only, but not wings are moulted from Sept. onwards. There is considerable individual variation in amount of 1st summer plumage acquired.

FIRST ECLIPSE. MALE.—Moult as in adult but usually less complete. Like adult male and only to be distinguished by retained juvenile feathers and juvenile wing.

SECOND WINTER AND SUMMER. MALE.—As adult winter but (*upper-parts*) feathers of head and neck more or less tipped blackish or cinnamon-buff; feathers of mantle and scapulars more or less tipped blackish; some scapulars mottled black-brown towards tip; centre of back and rump usually black-brown, sides of rump sooty-brown, in some intermixed with white, in others more or less white, feathers tipped dusky-brown; large white patch on sides of lower-rump, some feathers tipped or mottled blackish; rest of body-plumage as adult, but some feathers of *under-parts* on throat, fore-neck, and upper-breast narrowly tipped blackish; *tail* as adult; *remiges* as adult but *secondaries* in some narrowly tipped white, one next innermost as preceding ones, sometimes with a small white mark towards tip, but never with so much white as in adult; innermost secondaries narrower than in adult and only slightly sickle-shaped with outer or both webs white, distal halves black-brown, in some inner webs sepia (amount of white varies individually); *greater coverts* as secondaries, amount of white on innermost variable; *median coverts* white more or less tipped and mottled brown-black; *lesser coverts* and sometimes innermost median and those at edge of wing sepia (sometimes some innermost median and lesser coverts mottled white); rest of wing as in adult. This plumage is acquired by a body-moult from July onwards. *N.B.*—Blackish edges to feathers of head, upper and under-parts are more or less lost by abrasion.

SECOND ECLIPSE. MALE.—Moult as in adult eclipse. Plumage as in adult but distinguished from adult and first eclipse (before remiges are shed) by black-brown innermost *secondaries* more or less marked white, blackish tips (when not too abraded) to *median coverts* and faded brown *lesser coverts*.

THIRD WINTER AND SUMMER. MALE.—As adult winter but *back* and *rump* as in 2nd winter (but centre of rump intermixed with whitish feathers with ash-brown bases), white sickle-shaped innermost *secondaries* and *coverts* with brownish tips, some inner *greater* and *median coverts* mottled brownish.

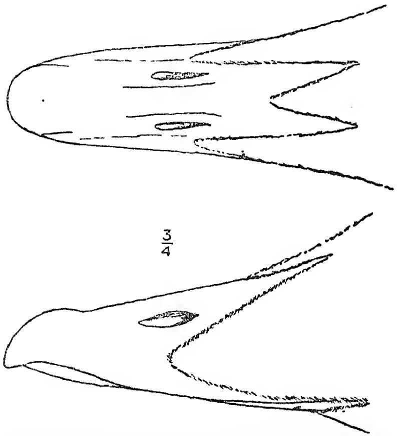
THIRD ECLIPSE. MALE.—In this and subsequent plumages as adult.

FIRST WINTER AND SUMMER. FEMALE.—*Upper-parts* resemble adult female eclipse more than winter and summer, from which it differs by crown being darker, feathers not so broadly edged buff; nape dark ash-brown, some feathers edged buff; new feathers of mantle, scapulars, sides of body, and flanks sepia shading to brown-black at tip and edged buff or tawny, edges much narrower than in adult; back and rump as juvenile; new upper tail-coverts brown-black with subterminal ochraceous-tawny bars; new feathers of sides of rump as adult; *cheeks* and *sides of neck* brown-buff rather more heavily streaked black-brown or dusky-brown than in adult; *chin* and *throat* ashy-white narrowly streaked dusky-brown or black-brown; new feathers of rest of *under-parts* as adult winter-summer. Most body-feathers, not usually all those of mantle or scapulars, sometimes some of back and rump, in some all, in others only a few upper and under tail-coverts, not usually lower-breast, belly, or vent but in some most of under-parts, sometimes central pair, or all tail-feathers but not wings are moulted Nov. to April or later. In some moult is very incomplete.

FIRST ECLIPSE. FEMALE.—Moult and coloration apparently as in adult eclipse and only to be distinguished when some worn juvenile body-feathers are retained and by worn juvenile wing when not moulted. Only one examined. SECOND WINTER AND SUMMER.—Like that of adult but white tips to secondaries and greater coverts narrower. Moult as adult. Second eclipse not examined but in third winter is not to be distinguished with certainty from adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 280–298 mm., tail 84–95, tarsus

45–52, bill from point of feathers on culmen 49–56, from point of frontal angle 68–77 (12 measured). ♀ wing 266–295, bill from point of feathers on culmen 44–56. Primaries: 1st narrow, pointed and about two-thirds longest primary-covert, 3rd longest, 2nd 2–8 mm. shorter, 4th 8–11 shorter, 5th 20–26 shorter, 6th 35–42 shorter; 2nd emarginated inner, 3rd outer webs. Innermost secondaries falcate, moderately long, tapering to a point, longest shorter than 6th or 7th primaries. Long lower scapulars stiff, tips of outer webs emarginated in ad. ♂ and in some ad. ♀, rest of scapulars softish more or less pointed at tip, in eclipse square. Tail short, rounded, with 14 stiff, pointed feathers. Bill nearly as long as head, higher than broad at base, depressed towards end where considerably narrowed but rounded, nail large, elliptical, convex and moderately decurved, with a thick grooved edge; maxillary tomium regular and nearly straight; lamellæ completely concealed. Feathers of fore-head continued to a narrow point on culmen about half-way between base of frontal angle and nostril, separating the backward processes or frontal angles of maxilla; loral feathering extending to about middle of nostril opening.



Bill of an adult female of the Common Eider (*Somateria m. mollissima*) from above and side to show frontal and loral feathering.

SOFT PARTS.—Bill (ad. ♂) basal part of upper mandible yellow to oil-green, rest bluish-grey tinged green, nail greyish-yellow to whitish, nail and tip of lower mandible pale greenish-grey, rest bluish-grey tinged green, (ad. ♀) greenish-dusky, nail of upper mandible bluish-horn, that of lower purplish; legs and feet (ad. ♂) olive-yellow to oil-green, membranes and soles greenish-brown, claws pale brown, (ad. ♀) greenish-dusky, (juv. ♂) lead-grey; iris rich brown.

[*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Common Eider is distinguished in all plumages from other British ducks by its large size and characteristic frontal angles of bill. For distinctions of King-Eider see under that species. *S. m. norvegica* (Norway east to Russian Lapland) and *S. m. islandica* (Iceland) have been separated, but the differences described appear to be too slight and too variable to justify this; *S. m. færoeensis* (Færoes) is smaller with much smaller bill; *S. m. borealis* (Spitsbergen, Greenland, N.E. Canada) has bill in adult male smaller and in spring bright orange-yellow, sickle-shaped innermost secondaries as a rule longer; *S. m. dresseri* (S. Ungava to S.E. Maine and southern half Hudson Bay) has frontal angles broader than in *S. m. mollissima* and green of head usually extending below black almost to bill, an indistinct black V on chin (but this also occurs sometimes in *S. m. mollissima*), colour of bill as in *S. m. borealis; S. m. v-nigrum* (N.E. Siberia, Alaska) has always in adult male a large black V-shaped mark on chin. *H.F.W.*

[NOTE.—An Eider shot at Graemsay (Orkneys) Dec. 14, 1904, and said to have been a Pacific Eider, *Somateria mollissima v-nigrum* Gray (*Bull. B.O.C.*, xv, p. 32: *Zool.*, 1905, pp. 74, 142, 143: *Ann. S.N.H.*, 1905, p. 183), was subsequently proved to be a variety of the Common Eider, *Somateria m. mollissima* (*cf. Bull. B.O.C.*, xix, p. 80: *Brit. B.*, i, pp. 15, 69, 125, 158).]

*PLATES 90 and 91.*

### 338. THE KING-EIDER—Somateria spectabilis (L.)

ANAS SPECTABILIS Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—Canada, Sweden).
*Somateria spectabilis* (Linnæus), Yarrell, iv, p. 463; Saunders, p. 461; Pract. Handb., ii, p. 363.

**Habitat.**—Unlike Common Eider breeds near fresh waters, frequenting for this purpose lochs and pools on tundra or in river-valleys, though not as a rule more than a few miles from coast, which is visited for feeding purposes. Outside breeding-season as much a sea-duck as Common Eider and haunts do not differ from those of that species, though as a rule it appears to keep more out to sea. In America migrants are less rare on fresh waters inland than Common Eider. *B.W.T.*

**Field-characters and General Habits.**—Male is at once distinguished from Common Eider by *black back and striking shape and coloration of head and bill. Latter is orange with broad shield at base* expanding to form huge and conspicuous knob in breeding-season, rising up to level of top of crown and bordered by black feathers. Crown and nape pale blue-grey, sides of face white tinged pale green, black streak on either side of throat meeting in a V in front. Fore-wing is not entirely white as in Eider, but bordered black in front. Female under favourable circumstances can be distinguished from Common Eider, having "a decidedly rusty or buffy-brown rather than a sooty-brown appearance. The unstreaked throat makes this part appear lighter than the top of the head, giving a contrasted effect which the . . . Eider does not have. The feathers of the lesser wing-coverts and scapulars are buffy or rusty-brown with broad black centres, giving a contrasted effect, which is noticeable at a considerable distance. This is very different from the uniform sooty-brown wing of the Eider" (L. Griscom). On breeding lochs can sometimes be observed at sufficiently close range for difference in feathering at sides of bill to be seen (*cf.* diagrams). Immature birds are not separable, unless this character can be made out. Total length *c.* 22 ins.; body *c.* 14 ins.

Flight and general habits outside breeding-season scarcely differ from Common Eider's, though it has not the Eider's reluctance to fly over land and apparently tends to feed in deeper water and stay submerged longer. H. W. Feilden records well authenticated case of birds feeding at depth of not less than 60 feet. Within its normal wintering range it occurs in large flocks in winter and on migration. Stated to use wings more or less under water. *B.W.T.*

**Voice.**—Male has a cooing note resembling Common Eider's, but described as not so loud or excited and of two to four syllables (B. Hantzsch) or as a trisyllabic "urr-urr-*urr*" with last note loudest, "a sort of drumming call, as when one expels air forcibly through the mouth with the tongue lightly pressed against the palate" (W. S. Brooks). Female has a hoarse "gak-gak-gak," presumably the same as a slight growling or grunting sound mentioned by A. L. V. Manniche, and an apparently more or less different alarm-note rendered "cock-cock" or "crōō-crōō" (G. J. van Oordt), and described by Manniche as a cackle like domestic duck's. *B.W.T.*

**Display and Posturing.**—According to A. L. V. Manniche display is much like Common Eider's, male raising front of body slightly as it utters its gentle note. W. S. Brooks observed display of three males round a female on land, with much neck-stretching and frequent bowing forward of head. *F.C.R.J. & B.W.T.*

**Breeding.**—Differs essentially in habits from Common Eider in nesting on open tundra in neighbourhood of fresh-water pools, and though a good many pairs may be concentrated in one district, nests are scattered and often far apart. Exceptionally a drake may be found on a Common Eider-holm: perhaps in most cases not fully mature. *Nest.*—Sometimes a hollow, quite exposed, among stunted heath or in grass tussock surrounded by water, little material besides the down and feathers except a few heather stems or grasses. Down quite different to that of Common Eider, much darker, sooty-brown, with faint light centres and a few whitish sprays here and there. Feathers usually small greyish, tipped brown (see Plate 91). *Eggs.*—4–7 (3 recorded): a case of 16 due to two or more ducks: rather elongated ovate, blunted tips: shell smooth, pale olive, rather browner as a rule and less green than Common Eider: size distinctive. Average of 57 eggs from Spitsbergen, 66·48×43·98. Max.: 76·8×43·3 and 69·7×46·5. Min.: 61×42·2 and 67·2×41·5 mm. Average weight of 5 eggs, 4·6 grams. A. C. Bent gives average of 152 eggs (American) as 67·6×44·7 mm. *Breeding-season.*—Latter part June and early July in Spitsbergen: from June 10 in Alaska. *Incubation.*—By duck alone: drake absent. Period? *Fledging.*—Female takes sole charge, but young tend to form packs, with some of the ducks in attendance. Single-brooded. *F.C.R.J.*

**Food.**—Chiefly Mollusca and Crustacea, but during breeding-season vegetable matter (stalks and leaves of phanerogams, etc.) are taken and larvæ of Diptera. Mollusca include *Trophon*, *Buccinum*, *Mitra*, *Turritella*, *Pecten*, *Mytilus*, *Modiolaria*, *Nucula*, *Leda*, *Cyprina*, *Mactra*, *Mya*, *Saxicava*, etc.: Crustacea, crabs (*Carcinus*, *Portunus*, *Inachus*, etc.) and shrimps: Echinodermata (*Echinus*, and brittle-star (*Ophiura*)). Young feed chiefly on minute Crustacea. *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. *England.*—Norfolk, one shot Jan., 1888, and two Nov., 1890, Yorks, one Aug., 1846, Farne Is. (Northumberland), three males shot Oct., 1861, Nov., 1873, Ap., 1885, and reported seen in summers 1862, 1873, 1875, 1880–1884, 1886, 1899, Kent, one found dead Nov., 1915. *Scotland.*—Examples obtained or satisfactorily identified coast of E. Lothian (winter 1847), Is. of May (adult male and others seen Oct., 1884), Fife (June, 1899, one Jan., 1925, one Dec., 1925 and Jan., 1926, five seen Dec., 1927, two males Dec., 1930), and Angus (several obtained winter 1879–80). Several recorded Shetlands (last Feb., 1899, June, 1910), and Fair Is. (May, 1910, Dec., 1935, Mar., 1936) and several Orkneys (last Feb., 1906, June, 1933). Recorded as seen off Jura and Islay. *Ireland.*—Down (Mar., 1850, Nov., 1897), Mayo (Dec., 1892), also recorded female, Dublin (Oct., 1837), and female Rathlin Is. (Nov., 1861). *H.F.W.*

**Distribution Abroad.**—N. Holarctic region. In Europe and Asia breeds only on Spitsbergen, Novaya Zemlya, Kolguev, Dolgoi, ? Waigatz, and Yalmal peninsula: perhaps also Kanin peninsula. In America breeds Greenland and arctic coasts of Canada, from Labrador, Hudson Bay, James Bay to Alaska and Bering Sea. Winters coasts of N. Russia, Finland, Norway, Bear Is., Færoes, and Iceland. Occurs Denmark. Casual S. Baltic, France, Italy, Hungary, and S. Russia. In America on E. side to Great Lakes and Virginia: on W. to Aleutian, Kodiak, and Shumagin Is. Casual Iowa and California. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head, neck,* and *upper-parts*) feathers bordering upper mandible, frontal feathering, eyelids, patch below and behind eye and broad V-shaped mark on throat black; fore-head and crown pearl-grey deepening to gull-grey on nape and upper-part of sides of neck, sometimes bordered on nape by dark slate line; white eye-stripe continued on to side of neck (sometimes obsolete); patch of emerald-green on cheeks narrowing to streak behind eye; lower-nape, middle of upper-mantle, chin, and throat white, lower-mantle same but feathers with ash-brown bases often imperfectly concealed; sides of upper-mantle vinaceous-buff; scapulars, back, centre of rump, and upper tail-coverts dull black; large patch on side of rump white, some feathers tipped black; (*under-parts*) upper-breast vinaceous-buff or pink-buff; lower-breast, belly, and vent brown-black, feathers with ill-concealed drab-brown bases; rest of under-parts black; axillaries white; under wing-coverts mostly white; *tail-feathers* sepia; *primaries* and their *coverts* and bastard-wing brown-black shading to drab-brown on inner webs; *secondaries* with outer webs black, inner webs sepia, outer ones narrowly tipped white, innermost with light brown shaft-streak; *greater coverts* as secondaries, in some with small white spot at tip; *median* and lower *lesser coverts* white, some narrowly tipped blackish; rest of wing-coverts including innermost median, brown-black or sepia, latter and some lesser tipped white; amount of white on wings variable, in some coverts at edge and bend of wing and most lesser coverts white. This plumage is acquired by a body-moult Sept. to Jan. *N.B.*—When fresh, feathers of upper-mantle and upper-breast have blackish edges.

ADULT MALE. ECLIPSE.—Moult apparently identical with that of *S. m. mollissima* takes place July and Aug. and coloration almost identical but *scapulars* uniform brown-black without any white markings; *lores* and *cheeks* lighter than in *S. m. mollissima,* feathers buff broadly tipped black-brown; *chin* and *throat* dusky-white, feathers mostly tipped ash-brown; rest of *neck* as in *S. m. mollissima*; feathers of *upper-breast* mostly sooty-brown with a white marking or drop towards tip, more or less barred black-brown (in some these feathers more or less ashy-white barred black-brown) with buff tips, sparsely intermixed with feathers with distal halves white (in *S. m. mollissima* these latter feathers are abundant). *N.B.*—Sometimes worn winter feathers are retained on mantle and upper-breast.

ADULT FEMALE. WINTER AND SUMMER.—Somewhat like adult *S. m. mollissima* but (*upper-parts*) crown and nape more narrowly streaked black, feathers edged redder tawny; sides of face, sides of neck and lower-nape tawny or cinnamon-buff more or less narrowly streaked black-brown; chin and throat paler, faintly streaked dusky-brown; rest of upper-parts as in *S. m. mollissima* but feathers edged redder tawny or chestnut (in some paler), scapulars with irregular tawny markings; (*under-parts*) upper-breast, flanks, sides of body, sides of vent, and under tail-coverts reddish-tawny, feathers with dusky bases and irregular U- or V-shaped brown-black markings; rest of breast, belly, and vent uniform sooty-brown, feathers with imperfectly concealed pale drab bases, sometimes tipped buff-brown and sometimes barred black-brown especially on vent; axillaries, under wing-coverts, and tail as in *S. m. mollissima; wing* as in *S. m. mollissima* but innermost *secondaries* and *coverts* in some bordered on outer webs chestnut-brown instead of tawny, *median* and *lesser coverts* as mantle. This plumage is acquired by complete body-moult Nov. to March. By late summer plumage becomes considerably paler by fading and wear.

ADULT FEMALE. ECLIPSE.—Most feathers of head, neck, mantle, and scapulars (some of back, rump, and upper tail-coverts), upper-breast, sides of body and flanks, apparently not rest of under-parts are moulted first, followed by wings and tail in Aug. and Sept. Feathers of *upper-parts* with paler edges than in winter and summer. Crown and upper-part of nape heavily streaked brown-black, rest of nape ash-brown, feathers more or less edged buff; feathers of mantle and scapulars edged cinnamon-buff, new feathers of back and upper tail-coverts as mantle but tips narrower, tail-coverts with irregular blackish subterminal bars; (*under-parts*) new feathers of upper-breast paler; sides of body and flanks as scapulars.

NESTLING.—Upper-parts and sides of body as in Common Eider but lighter; cheeks lighter, line through eye indistinct; chin, throat, and under-parts pale ashy-white; down of upper-breast dusky-brown towards base; loral and frontal feathering as in adult female.

JUVENILE. MALE.—Like juvenile Common Eider but head and neck lighter, upper-parts and wing-coverts more broadly edged deeper buff, under-parts lighter. (*Upper-parts*) crown heavily streaked black-brown, feathers edged light buff; sides of face same but streaks narrower; nape ash-brown, feathers tipped light buff; upper-parts as in Common Eider but lighter, feathers more broadly edged warm or cinnamon-buff; (*under-parts*) chin, throat, sides of neck, and fore-neck ashy-white more or less spotted or streaked dusky; upper-breast, sides of body and flanks and under tail-coverts pale ashy with subterminal bars or shadings of sepia or dusky and tipped warm buff; rest of under-parts ash-brown or drab, feathers more or less barred dusky or black-brown and mostly shading to buff at tips; *tail-feathers* as in adult female but mostly edged warm buff at tip; *wing* as in adult female but *secondaries* black-brown or sepia, paler on inner webs, innermost and coverts edged cinnamon-buff; *greater coverts* as secondaries, in some tipped buff-white or more or less edged buff; rest of *wing-coverts* much as upper-parts. FEMALE.—As male but *speculum* lighter, *back* and *rump* in some more broadly edged buff.

FIRST WINTER. MALE.—(*Head* and *neck*) feathers of crown and upper-part of nape bistre-brown or snuff-brown more or less barred blackish at tip; loral feathering and cheeks black-brown, more or less tipped and barred lighter brown; nape, sides of neck, chin, throat and fore-neck blackish, feathers with whitish bases ill-concealed on throat; a black V more or less distinct on chin and throat; a few new *scapulars* and *flank-feathers* tipped buff-brown are also acquired. Moult, which is confined to head, neck, sometimes scapulars, and flanks, commences in Nov. FIRST SUMMER.—No line can be drawn between these plumages. Distinguished from Common Eider in similar plumage by black *scapulars* and different juvenile *under-parts*. (*Upper-parts*) crown and upper-part of nape as first winter, but sometimes intermixed with pearl-grey feathers, rest of nape white, feathers tipped blackish; new feathers of upper-mantle white, more or less broadly tipped black, those of mantle, scapulars and upper tail-coverts black as in adult, sides of rump intermixed with white feathers; (*sides of head*) a black patch under eye; cheeks as in first winter, sometimes intermixed with whitish feathers tipped blackish, sometimes tinged green in front of eye; lower part of loral feathering whitish; (*under-parts*) chin and throat whitish with an irregular and ill-defined brown-black V-shaped mark, feathers tipped white or buff; throat and fore-neck white, feathers tipped dusky-brown or blackish; rest of sides of neck as nape; upper-breast cream-buff, feathers tipped blackish; sides of body, flanks, and under tail-coverts black as adult; belly sometimes with some new sooty-black feathers; rest of plumage as juvenile but sometimes central pair and exceptionally all *tail-feathers* are renewed and like adult. Some juvenile body-feathers, only a few odd feathers on lower-breast, belly and vent, sometimes central pair of tail-feathers but not all those of mantle and scapulars, not back, rump or wing are moulted Nov. to May.

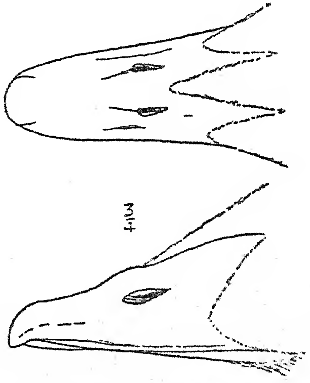
FIRST ECLIPSE. MALE.—Some feathers of head, nape, mantle, scapulars, patch on sides of rump, upper tail-coverts, cheeks (in some apparently chin and throat), most of upper-breast, sides of body, flanks, sometimes under tail-coverts but not all feathers of mantle and not back, rump, lower-breast, belly, vent, tail or wings are moulted in Aug. Plumage as adult eclipse but some juvenile body-feathers retained especially on under-parts. (*Head* and *neck*) nape lighter than in adult, ash-brown instead of sooty-brown; lores and cheeks buff, feathers with narrower and fewer black-brown tips; chin, throat, fore-neck, and sides of neck ashy-white, feathers tipped buff; (*upper* and *under-parts*) scapulars, sides of body, and flanks brown-black as adult but with narrow buff tips, new under tail-coverts blackish barred buff; feathers of upper-breast mostly whitish with dusky-brown bases, tipped buff and more or less barred black-brown.

SECOND WINTER AND SUMMER. MALE.—As adult winter but gull-grey feathers of occiput with dusky-brown tips when fresh; feathers of cheeks, sides of neck, nape, mantle, and upper-breast more or less tipped blackish (subsequently lost by abrasion); *wing* as adult but *lesser coverts* brown-black, *median* with less white and mostly tipped blackish and sometimes uniform sepia, two or three only marked with white (amount of white on wing-coverts varies individually). This plumage is acquired by a body-moult Sept. to Jan. SECOND ECLIPSE.—Not examined but probably as adult eclipse.

THIRD WINTER AND SUMMER.—Apparently as adult.

FIRST WINTER. FEMALE.—A certain amount of adult plumage is acquired: easily distinguished from adult by retained juvenile body-feathers and wings. (*Upper-parts*) sometimes crown and nape as adult but edges of feathers duller and streaks narrower; new scapulars with narrower and duller reddish-tawny edges; (*under-parts*) new feathers of upper-breast, sides of body, flanks, and new under tail-coverts edged duller tawny. Birds occur in May, which, except for some feathers of head and scapulars, are still in juvenile plumage. Some body-feathers, not all those of mantle, not back (in some a few odd feathers), some feathers of rump, not lower-breast, belly, vent or tail-coverts, not usually tail (sometimes central pair) and not wings are moulted Nov. to May.

FIRST ECLIPSE. FEMALE.—Moult as in adult female but some feathers of breast, belly, and vent appear to be moulted. Only to be distinguished from adult eclipse by retained juvenile feathers of *under-parts* and retained juvenile *wing* when not moulted. In the one bird examined (20/8/17 ♀ in coll. E. L. Schiöler) cheeks, chin, and throat appeared not to have been moulted, both wings were in a flightless condition.



Bill of an adult female of the King-Eider (*Somateria spectabilis*) from above and side to show frontal and loral feathering.

SECOND WINTER AND SUMMER. FEMALE.—Like that of adult but if a series is compared *upper-parts* less brilliant, white tips to *secondaries* and *greater coverts* narrower, in some secondaries faintly edged ash-grey instead of white. Moult presumably as in adult. SECOND ECLIPSE.—Not examined. Probably as adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 275–288 mm., tail 79–86, tarsus 42–47, bill from frontal feathering on culmen 28–34 (12 measured). ♀ wing 260–282, bill 30–35. Primaries: 1st narrow, pointed and a little more than half longest primary-covert, 3rd longest, 2nd 1–6 mm. shorter, 4th 8–11 shorter, 5th 22–30 shorter, 6th 39–47 shorter. Feathers of mantle and scapulars in female with somewhat pointed or rounded tips, not square as in female Common Eider. Long stiff scapulars with outer webs more deeply emarginated than in Common Eider, in ad. ♀ less emarginated than in ♂. Base of upper mandible in adult ♂

spread out on each side into a shield or lobe, which commences to develop about Feb., becomes enormous during breeding-season, then subsides and is absent in eclipse plumage and in winter; absent in females and immature males. Frontal feathering extends almost to nostrils and loral only about half-way. Other structure as in Common Eider but bill smaller.

SOFT PARTS.—Bill (ad. ♂) flesh-coloured to orange, sides of upper mandible and soft frontal lobes bright orange, to red-orange, (ad. ♀ and first winter ♂) pale greenish-grey, nail in ad. ♀ bluish-grey tinged yellow; legs and feet (ad. ♂) dull orange, webs dusky, claws brown-black, (ad. ♀) dull greenish-grey, (first winter ♂) dull ochre; iris (ad. ♂) bright yellow, (ad. ♀ and first winter ♂) dull yellow. [*A.C.M.*]

**Characters.**—No subspecies. Distinguished from Common Eider: adult males by pearl-grey crown, black scapulars and black innermost falcate secondaries and broad V-shaped mark on throat, and females and immature males by frontal and loral feathering (see structure). [*A.C.M.*]

## Genus MELANITTA Boie[1]

*Melanitta* Boie, Tagebuch Reise Norwegen, pp. 291 and 351 (1822—Type by subsequent designation of Eyton, 1838, *Anas fusca* L.).

Structurally nearest to *Aythya* and *Bucephala* but windpipe different (as also in some species of same genus). Bill rather wide, a little shorter than head, tip compressed, serrations coarse, nail occupying whole tip of bill. Nostrils behind middle of bill. Males with knob at base of culmen, swollen in adults. Feathering extending more or less on to upper mandible, but not in points, different in each species. 14 to 16 rectrices, tail cuneiform, more or less stiff. Males black, females dark brown. Eggs brownish, not greenish. 3 species, 2 of which in several subspecies, northern portions of Northern Hemisphere.

*PLATES 81, 87a, and 90a.*

### 339. THE COMMON SCOTER—Melanitta nigra nigra (L.)

ANAS NIGRA Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—Lapland and England).
*Œdemia nigra* (Linnæus), Yarrell, iv, p. 472; Saunders, p. 465.
*Oidemia nigra nigra* (L.), Pract. Handb., ii, p. 369.

**Habitat.**—In breeding-season usually frequents lochs of hilly moorland or tundra, or sometimes in fell and mountain country at considerable elevation, but the Irish haunt is a large lake with wooded islands. Outside breeding-season exclusively marine, preferring open stretches of sea not far from coast and generally avoiding "broken water or skerries such as are frequented by Eiders and Velvet-Scoters" (Millais). Storm-driven or "oiled" birds occur at times on fresh waters, but odd individuals are too frequent on inland lakes and reservoirs during quite settled weather at migration seasons to be dismissed as merely "accidental." Some non-breeding birds remain on sea during summer. *B.W.T.*

**Field-characters and General Habits.**—*Drake is entirely glossy black relieved only by conspicuous patch of apricot-yellow on otherwise black bill.* Short pointed tail elevated like Pintail's when bird is swimming. Distinctive feature of dark brown females and immatures is *pale whitish-brown side of head*, which is more conspicuous in field and more strongly contrasted with dark crown than might be expected from many illustrations or even mounted specimens. Head-pattern of female Red-crested Pochard is rather similar (for distinctions see under that species), but different habits give little opportunity for confusion except in case of solitary birds on fresh water. Wing in both sexes uniform, without bars. Male only assumes an extremely imperfect eclipse, which is seldom seen, in which head and neck are merely rather duller black, and flanks and under-parts browner than in full plumage. Young males begin to show some black feathering towards end of year, which increases slowly till moult in July, though final amount is variable and juvenile wing-feathers are retained. Bill of adult female blackish (of adult male, see above), legs blackish in male, browner in female. Total length *c.* 19 ins.; body *c.* 12½ ins.

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[1] This name must be used in the place of *Oidemia* Fleming, *Philosophy of Zoology*, because of its priority (see note under *Tadorna*, p. 221).

Usually considered a shy species. Though capable of riding out heavy seas it avoids rough water when it can. It rises with some difficulty, but more easily than other scoters if there is a slight head wind (Millais), and flight is direct and rapid with quick wing-beats accompanied by slight whistling sound; usually low over waves or fairly low, but at times, and more frequently than Eider, at considerable height. Birds on migration will shoot down at headlong speed from high in air and with loud rushing sound, wings being closed till within a hundred feet or less of water (W. Brewster). Flies in long wavering lines or sometimes in wedge formation or denser irregular flocks. Is not averse to short cuts over land where not shot at. Except in breeding-season rarely seen on land; gait upright and awkward. Sometimes rests on sandbanks, etc. (Millais, G. Waterston), but this is much less usual than in eiders, etc., which frequently rest out of water. In spite of heavy build is very buoyant, riding lightly on water, but when alarmed swims with body deeply sunk, and head straight up. Occurs in suitable localities in large numbers, often dispersed in scattered parties while feeding, at other times packing in huge flocks. Seems to be mainly a day-feeder and to prefer moderate depths of, say, 10–20 ft. and probably does not reach bottom at more than 30 ft. (Phillips). Maximum depth recorded by J. M. Dewar was 21 ft. and 81% of dives were in 7–12 ft.; ordinary length of dive 18–30 secs., but 35–50 and even more recorded (Dewar, J. Cordeaux). Sometimes partially opens wings as it submerges, but not as frequently as Velvet-Scoter. H. Boase records excess of males up to 4 : 1 (in Mar. males only) in Tay estuary, but off English coasts an excess of female and immature birds is often noted. *B.W.T.*

**Voice.**—Notes of male (chiefly spring and late winter) are a low, rather musical, plaintive piping or bell-like call of several syllables described by A. Brooks as like "cōōr, cōōr, cōōr*lee*, cōōrlee," but by J. Cordeaux as "peu-peu-peu," and a double call "tuk-*tuk*," which when uttered by many birds in chorus comes in from sea as a pleasing murmur, sometimes punctuated in autumn by a tittering cry (C. Oldham); latter is probably the rattling "tuka-tuka-tuka-terk" of Phillips. Female has hoarse "kr-r-r-r" much like other diving ducks. *B.W.T.*

**Display and Posturing.**—In display male scuttles along surface for a few yards head almost under water making the rattling note or raises fore-part of body out of water with head carried high, tail cocked up and bill open, uttering the whistling note (A. Brooks). Chasing between both sexes also occurs and W. Brewster also notes a sort of revolving dance, all members of a flock following one another closely as they swim rapidly round and round in great circle, each bird using feet so energetically as to keep most of its body above surface. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds on moors near lakes or "dhu-lochs" on high ground, generally within a few yards of water: also at times on islands in lochs. *Nest.*—Hollow in peat, lined with grasses, and down, mixed with mosses and lichens and sheltered by heather. Down medium-sized, sprays dark brown, centres light. Feathers generally grey, lighter at tip (see Plate 87A). *Eggs.*—5–7 as a rule: 8–10 and once 13 recorded: ovate, slight gloss, creamy to buff. Average size of 95 British eggs, 65·35×44·89. Max.: 71·5×45·5 and 65·8×47·7. Min.: 59·3×44·5 and 66·6×41·3 mm. H. Goebel gives average weight as 5·2 grams (5·8 to 4·6 gr.). *Breeding-season.*—Occasionally late May: usually early June in Scotland. *Incubation.*—By duck alone, with completion of clutch. Period (in confinement) 27–28 days (A. F. Moody). *Fledging.*—Young tended by duck only. Period 6–7 weeks (B. Hantzsch). Single-brooded. *F.C.R.J.*

**Food.**—Staple food for greater part of year Mollusca, chiefly mussels (*Mytilus edulis*) but also *Margarita*, *Cardium*, *Venus*, *Tapes*, *Solen*, and *Thracia*?: also small Crustacea, including shrimps (*Crangon*) and sandhoppers (Gammaridea) and occasionally barley or beans washed out of wrecks. On fresh water in summer Mollusca (*Anodonta*, water-snails, etc.), insects (larvæ of Odonata, etc.), worms, and tubers, buds, etc., of water-plants, such as *Potamogeton*. *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident, passage-migrant and winter-visitor (early Sept.-end Oct. to end April-early June). Breeds Caithness, N. Sutherland, and parts of E. Ross and E. Inverness, also has bred near Loch Tummel (Perths) (two pairs 1921), Tiree (1889, 1897), Shetland (1911, 1928, 1931), and Orkney (1927); and bred on a lough in Ireland in 1905 (probably 1904) and has done so regularly since and is probably increasing slightly.[1] Common winter-visitor (young birds often remaining through summer) E. and S. coasts Great Britain, but in Orkneys, Shetlands, O. Hebrides and W. coast generally, less plentiful, though usually very common in some parts W. coast. In Ireland regular visitor to northern half, but scarce elsewhere. On inland waters, occurs in small numbers irregularly but fairly often and most frequently in April and Nov. *H.F.W.*

**Distribution Abroad.**—N. Holarctic region. The typical race breeds in Europe in Iceland, Spitsbergen (rarely), Bear Is., in Norway to 71°, but not in S.W.: N. Sweden, N. and mid Finland, N. Russia (Olonetz, Archangel, and Perm Govts., Novaya Zemlya, and Waigatz). In Asia in N. Siberia to Taimyr and Boganida. Replaced in E. Asia in Kamtschatka and Anadyr (perhaps also from Kolyma), Commander Is. and Japan to arctic N. America, from Aleutian Is. to Ungava and Newfoundland (*M. n. americana*). Typical race winters south to Baltic and North Sea and W. coast of Europe and Africa south to Rio de Oro. Casual in middle Europe, Madeira, Canaries, Azores, and in Mediterranean, Black and Caspian Seas, and in Greenland. American race winters south to California on west and exceptionally to Florida on E. side. *F.C.R.J.*

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[1] The statement in *A Practical Handbook* that it had also bred in another lough was based on a faulty identification of a nestling.

**Description.**—ADULT MALE. WINTER.—Entire body-plumage and tail black; (*upper-parts*) head, nape, sides of neck, and upper-parts glossed dull violaceous; feathers at base of upper mandible black without violaceous gloss, soft and downy in structure; those of rest of head and neck (not chin or throat) pointed at tip giving a characteristically "crimped" appearance, less pronounced on nape; (*under-parts*) middle of breast, belly, and vent rather a brownish-black, dusky-brown bases of feathers not being completely concealed; *primaries* brown-black, inner webs pale dusky-brown shading almost to white at utmost base; *secondaries* black, inner webs brown-black or dusky-brown, innermost black; *primary-coverts*, bastard-wing, and *greater coverts* brown-black, remaining coverts as upper-parts. This plumage is acquired by a body-moult from Sept. to March and sometimes April and May.

ADULT MALE. ECLIPSE.—No birds moulting into eclipse have been examined; some feathers of head, neck, and under-parts appear to be moulted, followed by wing and tail in Sept.-Oct. (*Head* and *neck*) crown, nape, sides of face and sides of neck duller black with less bluish gloss than winter and feathers square at tip and thus with little indication of "crimping" on head and neck; (*under-parts*) breast, belly, and vent browner than winter, feathers sooty-brown or drab-brown shading to black-brown at tip and with ash-brown bases; feathers of sides of body and flanks sooty-brown shading to black at tip; rest of plumage as winter.

ADULT FEMALE. WINTER AND SUMMER.—(*Upper-parts*) crown to below eye and top of nape black-brown; centre of nape dusky-brown; feathers of rest of upper-parts black-brown, broadly fringed olive-brown or cinnamon-brown; (*under-parts*) lores dusky-brown; cheeks, sides of neck, chin, and throat brownish-white or whitish-drab, most feathers tipped dusky-brown; remaining under-parts light sepia or drab deepening to black-brown on upper-breast, sides of body, flanks, vent, and under tail-coverts; feathers of breast, sides of body, and flanks usually with brown or yellowish-white edges, those of lower-breast, belly, and vent narrowly tipped darker (sometimes some feathers edged yellowish-white or greyish-white); *tail* black-brown; *primaries* sepia, outer ones with outer webs and tips darker brown, inner webs as male; *secondaries* sepia, darker on outer webs, innermost black-brown; *wing-coverts* sepia or olive-brown shaded buff-brown or grey-brown towards tip and with faint terminal dusky-brown tips. Moult as male. Abrasion and fading of edges of feathers of upper-parts gives a characteristically barred appearance in June and late summer.

NESTLING.—Lores, crown down to eye, centre of nape, and rest of upper-parts uniform black-brown; upper-mantle, sides of body, and flanks light sepia rather than black-brown; a tiny whitish mark below eye not always well-defined; chin and throat whitish; band across fore-neck dusky-brown; remaining under-parts greyish-white; down of sides of neck, belly, and vent more or less tipped dusky-brown.

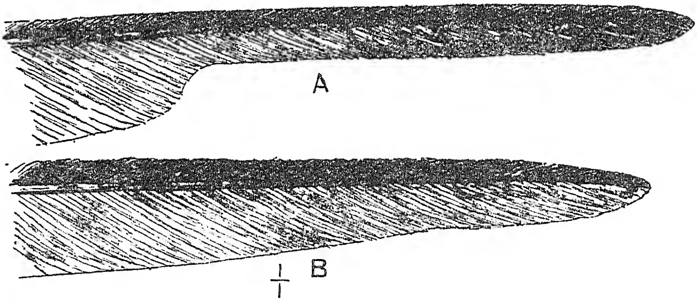
JUVENILE. MALE AND FEMALE.—Very like adult female but *upper-parts* lighter and *under-parts* ashy-white, feathers with dusky-brown bars or spots; *tail* as adult female but with square tips; coloration of *wing* as adult female, but see under "structure."

FIRST WINTER AND SUMMER. MALE.—New feathers of *head* and *neck* black as adult male but duller, ash-brown bases more or less exposed; new feathers of *upper-parts*, *sides of body* and *flanks* black, sometimes those of flanks black-brown tipped buff-brown; new feathers of *breast*, *belly*, and *vent* drab-brown or sooty-brown; new *tail* as adult but less tapering at tip; *wing* as juvenile. Some feathers of head, neck, mantle, scapulars, an odd feather of rump, some upper tail-coverts, some feathers of upper-breast, sides of body, flanks and under tail-coverts, sometimes some feathers of rest of under-parts and sometimes some tail-feathers are moulted from Dec. onwards. Amount of black plumage acquired varies considerably individually.

FIRST ECLIPSE. MALE.—(Not examined.)

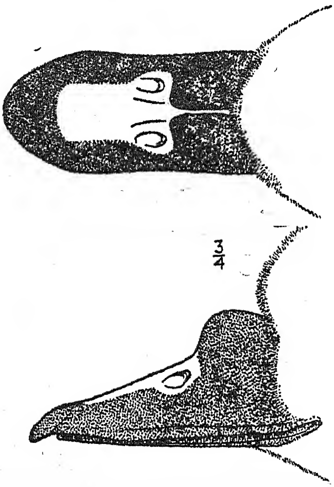
SECOND WINTER AND SUMMER. MALE.—Apparently as adult male but birds with *under-parts* browner than others may possibly be 2nd year males.

FIRST WINTER AND SUMMER. FEMALE.—Moult as in male. New body-feathers as adult female, new tail-feathers narrower, wing as juvenile.



The Common Scoter (*Melanitta n. nigra*). 2nd primaries of A. ♂ adult, B. ♂ juv.

MEASUREMENTS AND STRUCTURE.—♂ wing 228–242 mm., tail 80–100, tarsus 40·5–43, bill from feathers 45–49 (12 measured). ♀ wing 220–229, bill 42–46. Primaries: 1st narrow, pointed and less than half longest primary-covert, 3rd longest, 4th equal or 2–4 mm. shorter, 2nd 6–10 shorter, 5th 11–15 shorter, 6th 25–30 shorter. Emargination: ad. ♂, 2nd deeply emarginated inner web, 3rd very slightly both webs; ad. ♀, 2nd not nearly so deeply as in ♂, 3rd very slightly outer web; juv. ♂, 2nd emarginated but not deeply as in ad. ♂, narrower and more tapering towards point than in ad. ♀; juv. ♀, 2nd hardly distinguishable from that of ad. ♀. Innermost secondaries tapering to a point and longest shorter than 4th to 6th primaries. Scapulars more or less pointed at tip. Tail graduated and acuminate, 16 stiff, pointed feathers, central pair longest. Bill nearly as long as head, higher than broad at base, depressed and flattened towards tip which is rounded; upper mandible in ad. ♂ with well-developed knob usually absent in female and juvenile but in some females more or less developed; in forward young males developed by April; nail large and broadly elliptical. Feathers at base of bill form a nearly straight oblique line from fore-head to rictus advancing scarcely if at all on fore-head. Round base of upper-mandible in ad. ♂ a curious band of short down-like feathers.



Bill of an adult male of the Common Scoter (*Melanitta n. nigra*) from above and side.

SOFT PARTS.—Bill (ad. ♂) black, middle portion between and around nostrils from knob to nail yellow or orange, (ad. ♀) greenish-black (in some with a narrow band between nostrils extending almost to nail orange-yellow) and nostril openings yellow, (juv. ♂)[1] black with only a slight touch of reddish-yellow round nostrils (Millais), (juv. ♀) lead-coloured; legs and feet (ad. ♂) brown-black, webs blackish, (ad. ♀) olive-brown, webs blackish; iris brown. [*A.C.M.* revised by *H.F.W.*]

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[1] Some young males by Jan. have ridge of culmen almost to nail and area round nostrils yellow.

**Characters and allied forms.**—Uniform black wing, sooty-brown in females and young birds, and acuminate tail distinguish *M. n. nigra* from allied species. Adult male of *M. n. americana* (N. America) has nail arched and decidedly hooked and colour of bill different, females and immature males have nail more convex than in *M. n. nigra* (less marked in very young birds), adult female with small yellow patch on culmen between nostrils. [*A.C.M.*]

*PLATES 81, 87a, and 90a.*

## 340. THE VELVET-SCOTER—Melanitta fusca fusca (L.)

ANAS FUSCA Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—"Habitat in Oceano Europæo." Restricted typical locality: Swedish coast).
*Œdemia fusca* (Linnæus), Yarrell, iv, p. 476; Saunders, p. 467.
*Oidemia fusca* (L.), Pract. Handb., ii, p. 373.

**Habitat.**—In breeding-season frequents fresh-water lakes, ponds, and sometimes rivers, often in wooded country though also on open tundra, moors and fells, and from lowlands to birch zone on fells of N. Europe; also wooded islands of the Baltic. Maritime outside breeding-season like Common Scoter and often found in same places, though on the one hand perhaps more indifferent to exposed and stormy waters, and on the other more inclined, like Eider, to frequent estuaries and vicinity of shore where muddy mussel-banks afford good food-supply. In Brit. Is. at any rate, rarer than Common Scoter on inland waters. *B.W.T.*

**Field-characters and General Habits.**—In form and habits resembles Common Scoter, but rather larger and distinguished by *white wing-patch*, conspicuous on hinder aspect of wing in flight or when birds flap wings on water and also sometimes visible at rest, but then often hidden by flank-feathers. At closer quarters other differences are: small white patch just below eye, bill with most of side yellow or orange, with (black) knob only slightly developed, and reddish feet, which show when bird dives. In case of immatures and females the *two whitish patches on face, respectively in front of and behind eye*, are characteristic and afford good guide to identity at a fair distance even if wing-patch not visible. They are most pronounced in immatures and tend to become obscured or even lost in some adult females, especially the front one. As in Common Scoter eclipse is very little developed, drake merely becoming duller black with flanks and under-parts browner. The young males generally begin to show black feathers in Nov., but have not completed change by the time of the moult to eclipse (Millais). Bill of adult female blackish, legs duller than male. Total length *c.* 22 ins.; body *c.* 14 ins.

Generally much tamer than other scoters (Millais). They rise from water with a good deal of labour and often fly low over waves, when heavy heads and thick necks are noticeable, but almost as frequently at height of 50 feet or more (H. G. Alexander); will tumble out of air like Common Scoter (Phillips). Seldom comes to land, but will rest on shore in some localities (G. Waterston). Millais states that carriage of captive birds when walking is erect and gait slow and laboured. Rarely in large flocks; even where numerous is generally observed in scattered parties of *c.* 3–15 (Millais), which are fond of swimming in single file, and single birds are frequent. Feeds largely in rocky localities and well out to sea, but also on musselbeds close inshore, where it may mingle fortuitously with Eiders. Otherwise rarely associates with other species. J. M. Dewar did not observe diving in less than 4 ft., and longest dive and greatest depth recorded were 51 secs. and 24 ft. respectively. Dives of 180 secs. are recorded (J. Cordeaux) and Millais considers about 66 feet maximum depth reached; J. Grinnell (American race) puts maximum at 40 feet. Often partially opens wings as it dives. In S. and E. England many females and young occur (Millais considered them to preponderate to extent of *c.* 85%, but judging from oiled birds this is not now the case off Sussex: N.F.T.), but in Tay estuary *c.* 50% (Millais) and in Orkney far more (20–30 to 1: H. W. Robinson) are adult males, so that difference in migratory behaviour of adult drakes and rest seems well established. *B.W.T.*

**Voice.**—In contrast to Common Scoter is very silent. Male's note in case of American race is described as a double one, a sort of whistled "whur-er," as well as peculiar rattling or cackling call (U.S. Biological Survey notes, quoted by Phillips). Curious low purring note also recorded (A. Brooks). Female has harsh notes described as "kĕrr, kĕrr" and "ko*arr*, kĕrr" (F. E. Stoll). *B.W.T.*

**Display and Posturing.**—D. Gunn observed a display on fresh water on south coast in which male raised bill upwards and made shuddering leaps towards female. American race is described as lowering neck till it rests on water, then rushing along with rapid strokes of feet to pause near female, throw head erect and call (U.S. Biological Survey notes, quoted by Phillips). E. V. Baxter and L. J. Rintoul record display in autumn. *F.C.R.J. & B.W.T.*

**Breeding.**—Nesting-sites vary considerably: breeds on islands in Baltic on broken ground sheltered by bush or long grass and weeds: also in wooded country near lakes in Scandinavia at foot of tree: beyond tree-limit in north on tundra or in deep crevices of peat. *Nest.*—Foundation of grasses or if available leaves, twigs, etc., lined freely with down, which is dark brown, with rather indistinct light centres and sprays larger than those of Common Scoter, though colour similar. For feathers, see Plate 87A. *Eggs.*—Usually 5 to 8, but 9 to 12 and once 14 recorded: ovate, smooth, no gloss, creamy to warm buff, especially when fresh. Average of 130 eggs (42 by H. Goebel, 32 by E. Rey), 71·12×48·23. Max.: 77×48·5 and 71·2×51·5. Min.: 64·3×46·9 and 68·3×44·8 mm. Average weight (H. Goebel), 6·97 grams (9 to 5·9 gr.). *Breeding-season.*—From latter part of May in Baltic to mid-June in Lapland onward. *Incubation.*—By female alone: drake absent. Period 27–28 days (O. Heinroth). *Fledging.*—Young tended by duck. Single-brooded. *F.C.R.J.*

**Food.**—Almost exclusively marine Mollusca and some Crustacea, except in breeding-season when some tubers, roots, and buds of aquatic plants, worms, fresh-water Mollusca (water-snails), insects, and occasionally small fish are taken. Mollusca include *Buccinum*, *Bythinia*, *Valvata*, *Pectunculus glycimeris*, *Mytilus edulis* (in great numbers), *Anodonta*, *Cardium*, *Mactra*, *Tellina*, *Donax*, *Solen*, etc.: Crustacea, chiefly small crabs. *F.C.R.J.*

**Distribution.** — *British Isles.* — Passage-migrant and winter-visitor (mid-Sept.-Nov. to end April-end May). Regular (but not abundant except in a few places such as estuaries of Tay and Forth), E. coast Great Britain, and eastern half S. coast, very scarce western half S. coast and all W. coast, except N. Wales, Morecambe Bay and Solway where not uncommon. Common Orkneys, but only occasional Shetlands and I. Hebrides and scarce O. Hebrides. Rare visitor Ireland. Rare vagrant inland waters. Stated to have bred in Scotland on various occasions, but evidence not deemed conclusive (*cf. Bull. B.O.C.*, xliv, pp. 21 and 45, *Scot. Nat.*, 1926, p. 177, *Brit. B.*, xxi, pp. 38, 69, 100). Some individuals stay throughout summer. *H.F.W.*

**Distribution Abroad.**—N. Holarctic region. Typical race breeds in Europe in Norway from 60° to 71°, Sweden, Öland, Gothland, Baltic states, Finland, and Russia (from Polyesie, Dnieper, and Transcaucasia to R. Petchora, Perm Govt. and Novaya Zemlya). Also in Asia from Kirghiz Steppes, Akmolinsk, Baraba steppes, and W. Siberia to R. Yenisei. Replaced eastward to Anadyr and Kamtschatka by *M. f. stejnegeri*, and in N. America from British Columbia and Alberta to Ungava and Quebec (*M. f. deglandi*). Typical race winters from Baltic and N. Seas to coasts of Iberian peninsula, Black, Caspian, and Aral Seas: casually in Mediterranean and in middle Europe. Accidental Greenland, Iceland, Færoes, and Spitsbergen. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER.—(*Upper-parts*) head, nape, and sides of neck black glossed dull violet-purple or dull green; immediately below eye a small crescentic white patch; *upper-parts* black glossed dull green; (*under-parts*) chin, throat, and fore-neck brown-black; *under-parts* black, centre of breast and belly brown-black, drab-brown feather-bases imperfectly concealed; axillaries black-brown; under wing-coverts same more or less tipped white; *tail* black glossed dull green; *primaries* black glossed dull green, inner webs dusky-brown tipped black; *secondaries* white, first with outer web black-brown, succeeding ones sometimes more or less edged black-brown on outer webs, rest sometimes with a small dusky mark at tip of inner webs, one next innermost marked black-brown on inner web, innermost and all *wing-coverts* as upper-parts, *greater coverts* broadly tipped white, *lesser coverts* bordering edge of wing brown-black. This plumage is acquired by a body-moult Aug. to March.

ADULT MALE. ECLIPSE.—Head and neck, some feathers of mantle and scapulars and apparently most of under-parts are moulted first, followed by wings and tail in Aug. Very little material in moult examined, and only one (Aug. 12, 1917) in full eclipse plumage (in coll. E. L. Schiöler). This has: *crown, nape, cheeks*, sides of *neck*, *chin* and *throat* brown-black with no violet-purple gloss, feathers (except crown) with ill-concealed black-brown bases; white patch under eye as in winter-summer; *mantle* and *scapulars* intermixed with black-brown feathers; feathers of *sides of body* and *flanks* black-brown shading to brownish-white at base; *breast, belly*, and *vent* browner than in winter-summer; new black winter-summer feathers coming in on upper and under-parts, new *tail-feathers* short and in quill, five worn tail-feathers still remaining; *wings* short and in quill and bird in flightless condition. Bill as in winter-summer plumage.

ADULT FEMALE. WINTER AND SUMMER.—*Head* and *neck* black-brown or sooty-brown; between eye and base of upper mandible a small patch of white, feathers tipped black-brown; a larger patch on side of neck behind eye (these patches less distinct in fresh plumage); remaining *upper-parts* black-brown or sooty-brown, feathers with lighter edges; *under-parts* sooty-brown, upper-breast, sides of body, and flanks with lighter brown edges; feathers of middle of breast more or less edged white at sides, sometimes many feathers white with a spot or central marking of sooty-brown; *tail* black-brown; *wing-feathers* as male but usually browner-black; *greater coverts* sepia or black-brown, outer ones sometimes broadly tipped white; *median* and *lesser coverts* sooty-brown or black-brown with lighter brown edges. Moult apparently as male, birds with both wings flightless occur in Aug., Oct., and even Nov. In late summer owing to abrasion of edges of feathers *upper-parts* have a characteristically barred appearance; whitish *patch* on *lores* and *below eye* very distinct owing to abrasion of black-brown tips, that on lores sometimes continuous with patch below eye. Amount of white on *under-parts* varies considerably, in some under-parts are almost uniform, in others plentifully intermixed with white.

NESTLING.—Like that of Common Scoter, a tiny white spot on lores not always present; cheeks, sides of neck, chin, and throat purer white; band across fore-neck dusky-brown.

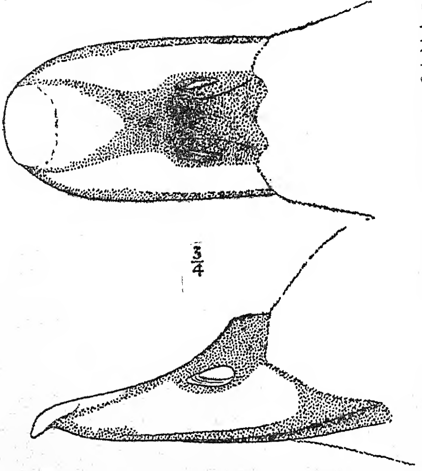
JUVENILE. MALE AND FEMALE.—Like adult female but *upper-parts* lighter and browner; (*under-parts*) feathers of upper-breast, sides of body, and flanks edged buff-brown or whitish; feathers of lower-breast and belly sooty-brown or drab-brown edged white, edges narrower and less pronounced on belly; *tail* as adult female, but tips square with bare shaft projecting; *wing* as adult female, but sometimes innermost *secondaries, median* and *lesser coverts* lighter and browner.

FIRST WINTER AND SUMMER. MALE.—New feathers of *upper* and *under-parts* black as in adult; most advanced birds examined have *lores* a mixture of new black and worn whitish feathers, no white *patch below eye,* this area black with a few worn whitish feathers. Some feathers of head, neck, mantle, scapulars, upper-breast, sides of body and flanks, sometimes some tail-feathers are moulted from Dec. onwards. FEMALE.—A certain amount of adult plumage is acquired; most advanced bird examined had feathers of *lores* worn and abraded, white *patch below eye* merely indicated by exposed white bases of new black-tipped feathers; new feathers like those of adult coming in on head, scapulars, upper and under tail-coverts, upper-breast, sides of body, and flanks; juvenile tail and wings worn.

FIRST ECLIPSE. MALE.—(Not examined.)

SECOND WINTER AND SUMMER. MALE.—Birds with brown-black under-parts may be 2nd year birds.

MEASUREMENTS AND STRUCTURE.—♂ wing 269–293 mm., tail 76–87, tarsus 42–47, bill from feathers 43–49 (12 measured). ♀ wing 251–260, bill 38–42 (5 measured). Primaries: 1st narrow, pointed and more than half longest primary-covert, 2nd longest, 3rd equal or 2–5 mm. shorter, 4th 10–18 shorter, 5th 24–35 shorter, 6th 40–50 shorter. Primaries not emarginated. Innermost secondaries somewhat pointed at tip, longest shorter than 6th or 7th primaries. Tail graduated, wedge-shaped, 14 stiff, pointed feathers, central pair considerably exceeding outermost pair in length. Bill very broad at tip with a moderate protuberance at base of maxilla; feathers extend slightly forward on to upper mandible but do not form prominent angles, loral slightly exceeds frontal feathering; sides of maxilla in ad. ♂ much swollen near rictus. Other structure as in Common Scoter but no down-like feathers at base of upper mandible.



Bill of an adult male of the Velvet-Scoter (*Melanitta f. fusca*) from above and side.

SOFT PARTS.—Bill (ad. ♂) protuberance at base, nostrils and band at lateral base and margin of bill and a streak on each side from nostrils to nail black, sides rich orange, nail and part of ridge behind nail reddish flesh colour, basal

half of lower mandible black, rest lake-red, (ad. ♀) entirely dusky, (juv. ♂) slate-black, nail brownish, (juv. ♀) greenish-black; legs and feet (ad. ♂) deep red (more orange inside tarsus), webs dusky-black, (♀) as male but duller, (1st winter ♂) reddish-ochre, webs sepia, (juv. ♀) orange-pink, webs blackish; iris (ad. ♂) greyish-white with an external dusky ring, (ad. ♀ and juv. ♂ and ♀) brown.
[*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Velvet-Scoter is distinguished by white speculum from other British scoters. Adult male of *M. f. stejnegeri* (N.E. Asia) has shorter and differently coloured bill with prominent projecting knob at base, anterior outline concave—nostrils broad and almost round, ♀ and young have also shorter bill and loral feathering extends almost to nostrils; *M. f. deglandi* (N. America) like male *M. f. stejnegeri* but knob less high, anterior outline not concave, sides of belly and flanks brown, frontal feathering extends as far forward as loral feathering which reaches almost to nostrils. [*A.C.M.*]

*PLATE 90a.*

## 341. THE SURF-SCOTER—Melanitta perspicillata (L.)

ANAS PERSPICILLATA Linnæus, Syst. Nat., ed. x, i, p. 125 (1758—Canada).
*Œdemia perspicillata* (Linnæus), Yarrell, iv, p. 481; Saunders, p. 469.
*Oidemia perspicillata* (L.), Pract. Handb., ii, p. 376.

**Habitat.**—In breeding-season frequents lakes, ponds, and rivers in both wooded and tundra or boggy country. Outside breeding-season as Velvet-Scoter, but on migration "does not drop into small lakes nearly as often in relation to its numbers" as *M. nigra* and *fusca* (Phillips). Winters commonly, however, on the Great Lakes and with other scoters will visit large ponds close to coast. *B.W.T.*

**Field-characters and General Habits.**—At sufficiently close range male may be identified by the *two patches of white on top of head and brilliant red, yellow and white bill.* No white on wing. Females and immatures have two whitish patches on side of head like Velvet-Scoter, from which, as ordinarily seen on sea, they are indistinguishable unless absence of white in wing can be definitely established (L. Griscom). Sometimes the patches are much obscured. Some, but not all, adult females have a more or less distinct whitish patch on nape in same position as male's, and if this shows clearly no other clue is needed: in case of a pair watched off Devon coast by W. Walmesley White and others this patch in female was visible with binoculars and telescope at distance estimated at 200–250 yds. The curious line of head and bill, more like an Eider, and quite different from other scoters, was also noticeable. Immature birds have much lighter under-parts than adult female, sometimes practically white. Bill of female dark, leg colour much as Velvet-Scoter. Total length *c.* 21 ins.; body *c.* 14½ ins.

General habits much like Velvet-Scoter's, but flight described as not quite so heavy, resembling that of Common Scoter. Occurs chiefly in flocks of 20–40 individuals, but at migration times often in vast flocks; keeps well away from shore and feeds both by day and night, usually in 18–30 ft. (C. E. Alford), or according to Phillips in 6 or 8 to 30 ft. Dives timed by Alford ranged from 10 to 45 secs. with intervals of 12–18 secs. Like other scoters often partially opens wings in submerging. *B.W.T.*

**Voice.**—A very silent bird. In courtship season males have a liquid explosive little note like " puk-puk " (Phillips) ; a low, clear whistle is also described (E. W. Nelson). Female has guttural croaking note, also seldom heard. *B.W.T.*

**Display and Posturing.**—Several authors (W. L. Dawson, A. Brooks, C. E. Alford) describe chases in which both sexes take part with much splashing, diving, and short flights. Several males may display to one female and all dive when she does ; males carry head and neck erect and at intervals dip beak in water, while females also bow (Alford). A. Brooks saw three or four males whirling round female like whirligig beetles, while C. L. Whittle, who observed courtship in *Oct.*, records males bowing so deeply as to immerse their heads and performing sudden short flights of about 75 ft., raising wings as they alighted till tips nearly touched. *F.C.R.J. & B.W.T.*

**Breeding.**—Little on record as to nesting and that by earlier workers. Audubon records a nest in a treacherous swamp : R. Macfarlane found a number of nests at some distance from water, well concealed under spreading branches of pine or spruce. *Nest.*—Mere depression in ground, lined with weeds, grasses, etc. and down, which is very dark brown, with whitish centres and tips. *Eggs.*—5–7, also recorded to 9 ; ovate or elliptical ovate, smooth, but not glossy, creamy-white to pinkish-buff. A. C. Bent gives average of 33 eggs as 61·6×43. Max. : 67·5×43 and 59×45. Min. : 58×41 and 59×40·5 mm. ; 13 measured by writer average 61·9×42·8 mm. *Breeding-season.*—From June 11 onward in arctic Canada. *Incubation.*—By duck only, a close sitter : males leaving when incubation begins (Audubon). *Fledging.*—No details, but young must be tended by duck. One brood. *F.C.R.J.*

**Food.**—According to J. C. Phillips, 90% of the food is animal matter, chiefly marine Mollusca, especially black mussel (*Modiola modiolus*) and north-west oyster (*Ostrea lurida*) ; but also razor-shells (*Siliqua*), scallops (*Pecten*), *Spisula*, *Nucula*, etc. : Crustacea (crayfish, crabs, barnacles, water-fleas, etc.), Echinodermata (brittle-stars (*Ophiuroidea*), sea-cucumbers (*Holothuroidea*), Coelenterata (hydroids and sea-anemones)) and Annelida (marine worms) : also fish spawn. Some insects recorded : Ephemeroptera (nymphs of *Ephemeridæ*), Coleoptera (larvæ of water-beetles), and Diptera. Vegetable matter (10%) includes water-celery, buds, pond-weeds, *Zostera*, and marine algæ. *F.C.R.J.*

**Distribution.**—*British Isles.*—Rare vagrant. Most frequent Orkneys and Shetlands and Fair Is., where occasional examples not infrequently seen and seven recorded obtained. Several recorded seen elsewhere, including one Kent, Jan., 1914, pair Devon, Mar., 1924, seven Norfolk, Oct., 1925, and three Nov., 1927, and following obtained : O. Hebrides (one), Angus (one), Fife (one), Firth of Forth (one or two), Cumberland (one), Lancs (one), Scilly Is. (two), Cornwall (two), Devon (three), Dorset (two). Six Ireland. *H.F.W.*

**Distribution Abroad.**—N. Nearctic region. Breeds in N. America from N.W. Alaska, and casually Greenland south to Gulf of St. Lawrence, James Bay, Mackenzie and Ungava peninsula : possibly also in N. Manitoba, N. Saskatchewan, and Alberta (see *A.O.U. Check List*, 4th Edit.). Winters on E. coast south to Florida and on W. coast from Aleutian Is. to Lower California : also on Great Lakes, etc. Accidental in Bering Is., Bermuda, Færoes, Scandinavia, Finland, Heligoland, Belgium, Holland, France. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER.—*Upper-parts* black with dull greenish gloss on hinder-crown; (*head* and *neck*) white patch across fore-head from eye to eye reaching forward beyond lateral base of bill; white line below eye, not always present; long triangular-shaped patch of white on centre of nape, apex pointing towards mantle; this patch thickly intermixed with short black feathers completely concealed by long white ones; chin, throat, and fore-neck brown-black; (*under-parts*) feathers of lower-breast, belly, and vent tipped black, with ill-concealed drab-brown bases; rest of under-parts black; axillaries brown; under wing-coverts same, more or less tipped black, those covering primaries ash-grey edged brown; *tail-feathers* black or black-brown; *primaries* and their *coverts* and *secondaries* brown-black, inner webs drab-brown, brown-black at tip, innermost secondaries black, inner webs black-brown: rest of *wing-coverts* black. This plumage is acquired by complete moult Aug. to Dec. ECLIPSE.—I have examined only one male with wings short and in quill and am unable to distinguish an eclipse plumage; at one time during the moult, the white *nuchal patch* is absent owing to shedding of white feathers and consequent exposure of the short black feathers beneath.

ADULT FEMALE. WINTER AND SUMMER.—(*Upper-parts*) fore-head, crown down to eye, and upper part of nape black-brown; sometimes a distinct white nuchal patch (often ill-defined or absent), intermixed with short dark brown feathers completely concealed by long white feathers as in male; rest of nape and upper-mantle sepia; remaining upper-parts sepia or black-brown, some of upper tail-coverts and feathers of rump tipped black; (*sides of head* and *under-parts*) irregular whitish patch on lores, another in auricular region, feathers of both with dusky-brown tips (subsequently lost by abrasion); chin dusky-brown, feathers with ill-concealed white bases; remaining under-parts warm sepia or dusky-brown, feathers of breast, belly, and flanks sometimes tipped white, in others flank-feathers more or less black-brown towards tip; axillaries and under wing-coverts sepia, some of latter edged white; *tail-feathers* black-brown or sepia; *primaries, secondaries* and their coverts and bastard-wing black-brown or warm sepia, inner webs drab-brown shading to black-brown or warm sepia at tips of primaries; *innermost* secondaries brown-black or warm sepia, inner webs sepia or drab-brown, rest of *wing-coverts* sepia. Moult as in male. In late summer feathers of upper-parts have edges worn and faded giving upper-parts a barred appearance.

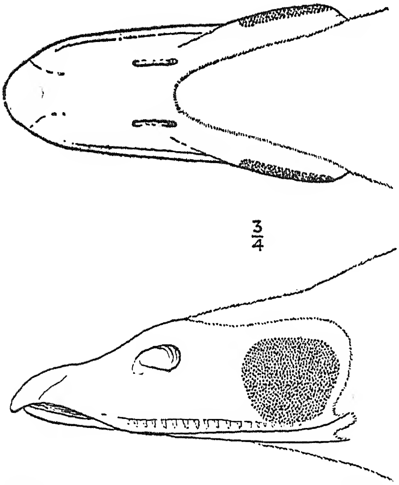
NESTLING.—(Not examined.) J. C. Phillips describes it as like that of Common Scoter, but white dot immediately below eye usually present in Common Scoter is absent, and frontal feathering extends on to culmen in V-shape instead of being cut straight across as in Common Scoter.

JUVENILE. MALE AND FEMALE.—Like adult female, but never with a white *nuchal patch*, white *patch on lores* and *auricular* region often ill-defined; (*under-parts*) feathers of breast and belly lighter than in adult female, being pale dusky-brown broadly tipped white, sometimes breast and belly more or less white; feathers of upper-breast, sides of body, and flanks more or less edged buff-brown which fades to buff-white; *tail* and *wings* as in adult female, but tips of tail-feathers square with bare shaft projecting.

FIRST WINTER AND SUMMER. MALE.—A varying amount of black plumage of adult is acquired; sometimes head, neck, upper-mantle, scapular region, rump, upper and under tail-coverts, fore-part of body and sides of body and flanks are black; crown black with no white patch; nape with white triangular patch. A varying amount of body-feathers, tail, but not wings, are moulted from Nov. to April, but apparently juvenile feathers are retained on mantle and under-parts. FEMALE.—A certain amount of adult plumage is acquired, but juvenile feathers of lower-breast, portions of mantle and wings are retained. Moult as in male.

SECOND WINTER AND SUMMER. MALE.—Birds with under-parts browner than others may be in their 2nd year.

MEASUREMENTS AND STRUCTURE.—♂ wing 240–256 mm., tail 75–84, tarsus 40–43, bill from feathers on culmen 34–37 (12 measured). ♀ wing 223–235, bill 35–38. Primaries: 1st narrow, pointed, and about two-thirds longest primary-covert, 3rd longest, 2nd about as long, 4th 8–12 mm. shorter, 5th 22–26 shorter, 6th 34–40 shorter; 2nd slightly emarginated on inner web in ad. ♂, ad. ♀ has 2nd broader than in ♂ and less emarginated, juv. ♀ 2nd slightly narrower than in adults. Innermost secondaries pointed at tip and longest longer than 6th or 7th primaries; long scapulars pointed at tip. Tail cuneate with 14 stiff, pointed feathers. Bill about same height and breadth at base, depressed and flattened towards tip where it is narrower but rounded; upper mandible in ad. ♂ with a basal protuberance with convex and descending outline, lateral base bulging with basal outline convex, in ad. ♀ culmen not appreciably elevated at base, bulge at lateral base of bill scarcely marked; in juv. ♂ and ♀ there is no basal protuberance, and lateral bulge is hardly apparent, but in juv. ♂ it commences to develop in winter; nail large, broad but narrowed terminally. Feathers on fore-head extending in a broad stripe nearly or quite as far as posterior end of nostril, but those of lores not advancing beyond rictus.



Bill of an adult male of the Surf-Scoter (*Melanitta perspicillata*) from above and side.

SOFT PARTS.—Bill (ad. ♂) upper mandible with square black patch at base margined orange except in front, where there is a patch of bluish-white extending to near nostrils, basal protuberance deep reddish-orange lighter towards nail, shading to rich yellow towards margins, nail dingy greyish-yellow, lower mandible flesh coloured, (ad. ♀) greenish-black, black spot at lateral base slightly if at all indicated; legs and feet (ad. ♂) orange-red, webs dusky tinged green, claws black, (ad. ♀) yellow-orange, webs greyish-dusky, claws black, (juv. ♂ Nov.) dull orange, darker at joints and back of tarsi; iris (ad. ♂ and ♀) yellowish-white, (juv. ♂) brown. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Black wing of adult male, black-brown in female and immature birds, absence of white speculum together with frontal feathering which extends forward considerably along culmen (loral feathering not extending beyond rictus) and white patches on head distinguish the species. [*A.C.M.*]

## Genus **MERGUS** L.

MERGUS Linnæus, Syst. Nat., ed. x, i, p. 129 (1758—Type by subsequent designation, Eyton, 1838, *M. serrator*).

Differ from other ducks, geese, and swans by the narrow, slenderer bill, in which the upper mandible does not overlap the lower. There are no lamellæ, but on the edges of both mandibles are saw-like sharp teeth, directed slightly backwards. Nail large, occupying whole tip, sharply decurved. Nostrils large and open slightly beyond middle of mandible. Feet large, hind-toe broadly lobed, outer toe weaker than inner. Both sexes with more or less elongated head- or neck-feathers, forming more or less crests. Tail rounded to almost cuneiform. Rectrices 16–18. Sexes different. 7 species, one with several subspecies. Europe, America, Asia, one with somewhat reduced wings and similarly coloured sexes on Auckland Is.

*PLATES 81, 87a, and 92.*

## 342. THE GOOSANDER—Mergus merganser merganser L.

Mergus Merganser Linnæus, Syst. Nat., ed. x, i, p. 129 (1758—Europe. Restricted typical locality : Sweden).
*Mergus merganser* Linnæus, Yarrell, iv, p. 488 ; Saunders, p. 471.
*Mergus merganser merganser* L., Pract. Handb., ii, p. 380.

**Habitat.**—In breeding-season frequents clear lakes and rivers chiefly in forested districts, or at least where some trees present, but also regularly in treeless regions of the high north, where quite small lochs, and even swamps may be resorted to for breeding, but usually not far from larger waters. Sometimes on sheltered inlets of sea. Outside breeding-season much less marine than Merganser, frequenting lakes, lochs, and larger rivers, and locally common on reservoirs, but also on estuaries and inlets of sea. *B.W.T.*

**Field-characters and General Habits.**—For general characters of "saw-billed" ducks (Goosander, Mergansers and Smew), see p. 220. For general study of habits and behaviour, see E. Christoleit, "Biologie der Säger," *Journ. f. Orn.*, 1927, pp. 385–404.

Goosander is largest species (bigger than Mallard), and drake has *bottle-green head* (*black at distance*), *white breast and sides, suffused, often conspicuously, with salmon-pink, and black back.* Head without distinct crest. Rump and tail grey; bill blood-red. Female has *back and flanks ash-grey, rich chestnut head, sharply defined white patch on throat, and white breast and under-parts*; mane-like crest formed by elongation of occipital feathers, which come to a kind of peak at back of lower neck; white wing-patch often concealed by flank-feathers, but prominent when wing is spread. In flight black and white appearance of drake is striking, under-parts, sides, and practically whole basal half of wing being white, while back, primaries, and head appear black. In female fore-wing is grey and white forms broad patch on hinder aspect of wing. For distinctions of both sexes from Red-breasted Merganser, see under that species. Full plumage of male is not complete till Nov. or Dec.; eclipse plumage, according to Millais, begins to appear in May and remains complete till Sept. or even Oct.; male then resembles female, but retains white fore-wing and has darker and browner back. Juveniles resemble female, but have shorter crest, upper-parts browner, white on throat duller (white is prolonged further down neck, but this is not noticeable in field), and breast greyish, not white. Young males in first year remain very like females, though some black feathers on mantle and other indications of male plumage are acquired. Legs red like bill, both less bright in female. Total length (ad. male) *c.* 26 ins.; body *c.* 18 ins.; female smaller.

Flight of usual Merganser type (see p. 220), close to water and on rivers often following every bend of stream, though at times it will rise high, but on migration is stated usually to fly in small parties at a great elevation. Sound of wings described as a humming whistle. Unless aided by wind it rises with some difficulty, splashing and flapping along surface for some way before getting clear. Though sometimes resting quite high on water, typical swimming position is low, and when alarmed will sink body till back is almost awash; swims rapidly. Walks more readily and considerably better than typical diving ducks, sometimes with remarkably horizontal pose considering backward position of legs (T. A. Coward), but according to E. Christoleit more often in the obliquely upright attitude of diving ducks, and can even run quite fast for short distances. In winter does not seem to come ashore much, though birds will occasionally land on shores of reservoirs, etc., but in spring spends a good deal of time resting and preening on shore close to water, on rocks, floating tree-trunks or ice. Also perches on branches overhanging water, sometimes some feet above it (Christoleit), and well up in trees when prospecting for nesting-holes. Markedly sociable, though seldom occurring in flocks of any considerable size, but rather in small parties of three or four to fifteen or a dozen, often associating with other species when resting, but not as a rule, except in case of odd birds, in the air (Christoleit). Males leave females as soon as incubation begins and remain in small parties till late autumn (Millais). Essentially diurnal in feeding habits, often swimming with tip of bill and even whole front of head immersed as it watches for fish. Mode of diving varies; often takes a considerable jump, but can also submerge quite quietly and can travel surprising distances under water. Also often travels rapidly on surface between dives. Maximum depth recorded by J. M. Dewar was 13½ ft. (but most dives were in 6–12 ft.) and longest dive 37 secs., but Coward records 110 secs. American race has been described as using partially opened wings under water, but C. W. Townsend concludes that they are not generally so used. This race has also been recorded diving from air. Will also feed in very shallow water, probing with bill amongst stones to disturb small fish, etc. (Millais), and according to Christoleit will also dabble with bill at surface like typical ducks. "Brown-heads" generally arrive in winter-haunts considerably before old drakes (thus in Tay estuary there is great preponderance of former from Sept. to Nov., but from Dec. on numbers are more equal with generally small excess of females: H. Boase). Some evidence that adult drakes tend to stay nearer breeding-haunts throughout winter; they are rare at all times in southern parts of winter-range (Phillips), yet according to H. W. Robinson "brown-heads" are much more numerous in Orkney. On English waters old drakes are commonly outnumbered by "brown-heads," but occur regularly. *B.W.T.*

**Voice.**—Male is very silent except in display, when a soft, low, croaking note is used (S. E. Brock and others). E. Christoleit renders note as "kārr," higher, weaker, and less coarse than female's note, often followed by quick, but not continuous series of rather weaker notes like "*ereck*," of ascending or more rarely descending pitch. The greater the excitement the more sonorous the notes until finally they take on a quite metallic, bell-like tone, more or less losing the "r" sound. A regular sequence of higher and rather lower notes "kerr korr, kerr kerr korr, kerr kerr korr - - -" repeated with a distinct rhythm and followed by "*ereck*" notes is also described. Female has a hoarse, guttural "kar-r-r" more often heard than male's note. Christoleit also records a weak, rather hard "teck" or "tock" usually repeated in more or less connected sequences, becoming stronger and more sonorous when excited. In display the sound is higher-pitched and more continuous, a peculiar croaking "wooden" sounding "ăckăckăckăck - - -" often introduced by the " kar-r-r " note. A hissing note when disturbed with brood is also described (Millais). *B.W.T.*

**Display and Posturing.**—Chief features of male's display are: (1) sudden and rapid stretching of head and neck perpendicularly upwards to fullest extent, bill gaping, and equally abrupt return to normal position; (2) rising up on water with beak touching breast; (3) sudden spasmodic movement of feet, throwing up a spurt of water, much more forcibly than in Goldeneye, and propelling bird forward a foot or two. Elevation of head-feathers, slight bowing and head-tossing also occur, and display is associated with much bickering, splashing, and chasing; may be observed from Nov. (S. E. Brock, L. Parmenter, and others). Details vary, but account of display of American race by C. W. Townsend agrees closely in essentials. He also mentions wing-flapping associated with posture 2, and states that tail is usually cocked up and spread; a posture in which head and closed bill are pointed upwards at angle of 45° is also mentioned. Female also postures to limited extent and has been observed to perform both actions 2 (Brock, Townsend) and 3 (Brock). E. Christoleit states that a formalized bill-dipping or drinking action (*cf.* Smew) is used by both sexes (as greeting as well as in display) and very freely by male, which may then raise head and neck completely vertically (distinct from vertical throw-up called attitude 1 above), and a sinuous movement of neck extended horizontally is also described. He observed ceremonial swimming by displaying parties, but less regularly than in case of Smew. Duck solicits coition by sinking low in water with head stretched out and tail raised at right angles; male prior to mounting displays nervous excitement by twitching head and neck, dipping bill in water and picking at own or female's feathers and may temporarily assume same attitude as female's; coition takes place in usual duck fashion, the male holding on to neck-feathers of completely submerged female, and is followed by usual bathing of female and wing-flapping by both birds (Parmenter, Townsend); observed in winter-quarters (Parmenter, Christoleit). American race on breeding-ground will rise high in air and circle round for hours at a time (H. S. Swarth), and as this is quite unlike normal behaviour it is probably a kind of display flight. Single pairs or several together will also perform aerial dives with neck extended and wings half-closed, producing peculiar hollow, rushing sound and checking while still out of gun range (Christoleit). *F.C.R.J. & B.W.T.*

**Breeding.**—Most breeding-ground in British Is. is within partially wooded area, but also nests where trees are absent, and abroad far beyond tree-limit. Most nests within easy reach of river or loch, often quite close. Same site used year after year. *Nest.*—No nest material used in many cases beyond dead wood, but withered grass and heather found in sites in banks. Commonest site is inside hollow tree, entrance may be high up, but also nests in cavities among boulders and in holes in banks sheltered by heather, as far in as 4–7 ft. (N. Gilroy). Abroad nests recorded inside deserted huts and in nesting-boxes. Down, plentiful, pale greyish or pearly-grey, colour much as that of Goldeneye but sprays much larger, though not so big as those of Sheld-Duck: occasional light centres. For feathers, see Plate 87A. *Eggs.*—Usually 7–13, but 14–16 recorded from Scotland and 17–19 abroad: 36 obviously due to more than one duck: broad ovate as a rule, smooth, creamy-white. Average of 100 British eggs, 66·38×46·41. Max.: 71·4×46·5 and

67·1×48·7. Min.: 61·4×45 and 65·4×44 mm. Average weight (E. Rey), 7·87 grams (8·7 to 6·6 gr.). *Breeding-season.*—From about mid-April onward in Scotland: not till latter part of June in Iceland. *Incubation.*—By duck alone: drakes flocking, but in isolated sites, male may remain in vicinity. Period about 34–35 days (W. M. Ross): 32 days in confinement (O. Heinroth). Begins on completion of clutch. *Fledging.*—By duck alone: drake takes no part. Young remain in nest 2–3 days: scramble to entrance and normally flutter to ground or water when called by duck. Said at times to be taken down by parent. Period about 5 weeks (F. Faber). Single-brooded. *F.C.R.J.*

**Food.**—Apparently entirely animal matter. W. E. Collinge (on basis of 25 stomach contents) estimates proportion of fish at 86·5%, including young salmon, trout, barbel (to 12 ins.), roach (to 8½ ins.), gunnel, bleak, perch, pike, dace (to 9½ ins.), blenny, herring, and eel (to 11½ ins.). R. Collett also records *Muræna.* As a rule small fish are taken, but above records show that large ones can be swallowed: Crustacea (6·5%): insects, Lepidoptera (caterpillars) and Coleoptera (burying-beetles and cockchafers): Annelida (worms), 2·5%: and frogs are also taken: in a single stomach 49 perch, averaging 3 ins., and a young pike have been found (W. Thompson). *F.C.R.J.*

**Distribution.**—*British Isles.*—Resident and winter-visitor (end Sept.-end Oct. to end March-early May). First known to breed Scotland 1871 and after large immigration 1875–6 commenced to breed widely in northern Scotland and has gradually spread since, although severely checked in many parts in interests of fresh-water fisheries. Now breeds Sutherland, E. and W. Ross, E. and W. Inverness, Nairn, Aberdeen, Perth and N. Argyll, also a few Dumbarton and Selkirk and has bred Dumfries. Elsewhere winter-visitor to estuaries and inland waters (especially numerous reservoirs lower Thames valley), but scarce Orkneys and occasional Shetlands, rare O. Hebrides, and somewhat irregular and uncommon, S. W. England, Wales and Ireland. Of five adults ringed Surrey in winter two were recovered where ringed in winter two years later and in April three years later, and three in S. or E. Sweden in April of following year. *H.F.W.*

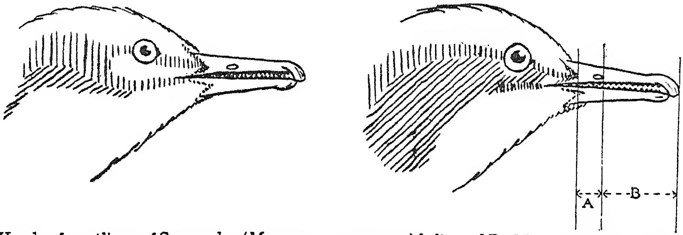
**Distribution Abroad.**—Holarctic region. Typical race breeds in Europe north to Iceland, 71° in Norway, N. Sweden, N. Finland, and Russia (R. Petchora, Novaya Zemlya, Yalmal, and N. Urals). In Asia east to Kamtschatka, Commander Is., and Kuriles. In south to the Baltic, Denmark, Germany, Austria, Switzerland, Yugo-Slavia (Bosnia), Romania (Dobrogea), and Russia (Leningrad, Vitebsk, Yaroslav, Kazan, Orenburg Govts.). In Asia Turkestan, Barnaul, Zaissan, Semipalatinsk, Altai, Tarbagatai to N.W. Mongolia. Replaced by *M. m. orientalis* from Pamirs to Himalayas and in N. America by *M. m. americanus* from Alaska and mountains of California on west and Newfoundland to Maine on E. side. Typical race winters in Baltic and North Seas to Marocco, N. Mediterranean, Black, Caspian, and Aral Seas: also Asia Minor, Iraq, and Persia to Sind. Casual Bear Is., Færoes, Mediterranean Is., Algeria, Tunisia, and Egypt. Other races range to N. India and Burma: in America to Lower California and Gulf of Mexico. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head* and *neck*) crown, nape, and sides of neck bottle-green, in some lights tinged amethyst (occipital feathers considerably elongated) ; fore-part of crown, lores, cheeks, chin, throat, and fore-neck dull black, all except chin and throat glossed greenish ; (*upper-parts*) lower-neck, upper-mantle, and outer scapulars bordering wing white, when fresh suffused pale salmon-colour, some feathers bordering lower-mantle vermiculated ash-brown and some tipped black ; rest of mantle and scapulars black ; back and rump ash-grey, feathers with dark shafts and more or less tipped or vermiculated white ; patch on either side at root of tail white, feathers finely vermiculated brown ; upper tail-coverts ash-grey with central shaft-streaks or shadings of ash-brown ; *under-parts* creamy-white (in life suffused pale salmon colour or sometimes deep cream) ; axillaries and under wing-coverts white, those covering primaries ash-grey ; *tail-feathers* ash-grey, more or less shading to ash-brown at edges ; *primaries* black-brown, paler on inner webs and shading to white towards base ; outer *secondaries* with outer webs black-brown, inner webs brownish-white, inner secondaries white, in some marked or vermiculated dusky-brown, innermost white with one or both webs narrowly bordered black, innermost one sometimes suffused dark ash-grey on inner web, short ones black-brown more or less suffused dark grey ; *primary-coverts, bastard-wing*, coverts at edge and bend of wing, and outer *greater coverts* black-brown ; rest of greater coverts white, innermost sepia with grey bloom ; *median* and some *lesser coverts* white, rest of lesser and inner median black-brown tipped white. This plumage is acquired by a moult of body-feathers and innermost secondaries from Sept. to Dec.

ADULT MALE. ECLIPSE.—The body-feathers (not all those of back and rump or tail-coverts, nor apparently lower-breast, belly, vent or under tail-coverts) are moulted first, followed by tail and wings in Aug. and Sept. Like adult female but easily distinguished by white *wing-coverts*. (*Upper-parts*) lores, crown, crest, and part of nape as juvenile, but crest longer (though shorter than in adult female) ; mantle sepia or dusky-brown, feathers edged bluish-grey, intermixed with feathers with black centres tipped bluish-grey ; (*sides of head* and *under-parts*) a whitish streak not always distinct from lower side of upper mandible to eye ; cheeks, sides of neck, and fore-neck paler than in adult female ; a narrow white streak down centre of neck to upper-breast ; remaining under-parts as adult female ; sides of body and flanks more plentifully intermixed with white feathers marked ash-grey ; *tail* worn and faded ; innermost *secondaries* shorter than in adult winter with inner webs dark ash-grey, outer webs greyish-white suffused pale ash-grey and narrowly bordered blackish-grey.

ADULT FEMALE. WINTER AND SUMMER.—(*Head* and *neck*) crown and elongated feathers of occipital region snuff-brown, feathers of crown mostly with blackish shafts ; feathers of lores black-brown edged snuff-brown, sometimes a small whitish patch below eye ; chin white ; upper-throat white merging into reddish cinnamon-brown of lower-throat ; rest of head and neck reddish cinnamon-brown ; (*upper-parts*) lower part of nape ash-grey, feathers tipped white ; mantle, scapulars, and upper tail-coverts bluish ash-grey, feathers with dark shafts and often shaded brownish-grey centrally ; back and rump as mantle but lighter, feathers of sides of rump tipped white ; (*under-parts*) feathers of lower-neck with pale ashy-grey centres more or less concealed by broad cream-white tips ; sides of body and flanks ash-grey, feathers with white tips, those bordering breast and belly white irregularly marked ash-grey ; remaining under-parts in life yellowish-salmon colour ; sometimes feathers of vent spotted ash-grey ; sometimes most of under tail-coverts with V-shaped marks ; axillaries, under wing-coverts, and *tail* as male ; *wing* as male but innermost *secondaries* and *coverts* pale ash-grey ; *greater coverts* as male but some with dusky-brown or ash-grey tips ; *median* and *lesser coverts* as mantle but lighter. This plumage is acquired by complete moult in autumn. Hardly any birds in moult examined and none with wings in quill, one (March) was moulting some body-feathers but more material is required to determine if there is more than one moult.

NESTLING.—Crown to below eye and centre of nape hair-brown tinged tawny; remaining upper-parts, sides of body, and back of thighs hair-brown or grey-brown (usually darker on back and rump), down with buff-brown tips; a white patch on wing, another on either side of back above thighs and continuous with white of under-parts (sometimes a small white patch on either side of back, a little below wing), another on either side of rump; black-brown streaks from above lores to eye and from gape to below eye divided by creamy band tinged tawny (lower dark streak usually more defined than in Merganser); rest of cheeks, sides of neck, and rest of nape more or less suffused tawny (usually less tawny on cheeks than in Merganser); remaining under-parts white.



Heads of nestlings of Goosander (*Mergus m. merganser*) left, and Red-breasted Merganser (*M. serrator*) right. The relative position of the nostril is diagnostic, the ratio of the lengths A/B in the Goosander being from ·5 to ·6 and in the Merganser from ·35 to ·45. (J. D. Macdonald.)

JUVENILE. MALE AND FEMALE.—Like adult female but (*head* and *neck*) feathers of fore-head streaked sepia; rest of crown, crest, and nape buff-brown suffused greyish olive-brown, crest much shorter and less abundant than in adult female; from lores to eye, a faint buff streak, feathers more or less streaked sepia; whole tone of *upper-parts* (especially scapulars) browner, not such a blue-grey as in adult female, feathers of lower-nape without white tips; (*under-parts*) a white streak down centre of throat, some feathers suffused reddish cinnamon-brown; sides of fore-neck as in adult female; lower-neck and sides of breast ash-grey or ash-brown, feathers tipped white; rest of under-parts white; *tail-feathers* as adult but structure juvenile; *wing* as adult female but in most juvenile *males median coverts* bordering bastard-wing more or less suffused pale greyish-white, innermost *secondaries* in juvenile *male* longer than in juvenile *female*, and sometimes those next *speculum* paler grey than in adult or juvenile female.

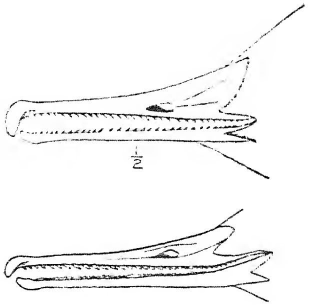
FIRST WINTER. MALE.—Like adult female in coloration but chiefly distinguished by new black-brown feathers tipped bluish ash-grey on *mantle* and by pure white *fore-neck* bordering upper-breast; also (*upper-parts*) sides of lower-nape white; sides of upper-mantle white, feathers more or less edged and vermiculated ash-grey; some new scapulars black-brown tipped bluish ash-grey, some with pale ashy-white centres or shadings, others with outer webs greyish-white and inner webs ash-grey; ash-grey feathers vermiculated whitish usually make their appearance at sides of root of tail; sometimes an irregular blackish streak through eye; (*under-parts*) chin and throat sometimes more or less spotted blackish; feathers bordering reddish-brown lower-throat tipped blackish forming an irregular semicircular ring (often incomplete); rest of fore-neck white; feathers of sides of body and flanks as adult female but plentifully intermixed with white feathers vermiculated grey; rest of plumage, *tail* and *wings* as adult female, but sometimes new innermost *secondaries* are acquired with outer webs (or both webs) greyish-white narrowly bordered blackish-grey, and inner webs grey. Most of the juvenile body-feathers (usually breast, belly, and vent), tail, and occasionally some innermost secondaries are moulted from Sept. onwards; sometimes many juvenile feathers are retained. FIRST SUMMER.—By March, sometimes even January, black feathers tipped ash-grey appear on *mantle*;

some white and some black *scapulars* and some white *flank* feathers, with outer webs and tips more or less vermiculated ash-grey, are also acquired.

FIRST ECLIPSE. MALE.—As adult eclipse but easily distinguished by ash-grey *wing-coverts*.

FIRST WINTER AND SUMMER. FEMALE.—As adult female but *crest* shorter and less abundant, *under-parts* whiter and innermost *secondaries* when not moulted worn and faded. Moult as in male, subsequent plumages like adult.

MEASUREMENTS AND STRUCTURE.—♂ wing 283–295 mm., tail 104–115, tarsus 46–50, bill from point of frontal feathering 55–61 (12 measured). ♀ wing 250–267, bill 45–51. Primaries: 1st narrow, pointed, and about two-thirds longest primary, covert, 3rd longest, 2nd as long or 2–7 mm. shorter, 4th 11–17 shorter, 5th 26–33 shorter, 6th 43–54 shorter; 2nd slightly emarginated inner web, 3rd outer web. Innermost secondaries long and tapering, longest shorter than 4th to 6th primary; in eclipse shorter; scapulars long and tapering to a point; in eclipse short with square tips. Tail slightly rounded, 18 stiff feathers slightly rounded at tip. Bill about length of head, nearly straight or slightly re-arcuate, of greater height than breadth at base, tapering to middle beyond which slender and cylindrical, upper mandible with dorsal line somewhat concave to middle then straight and slightly ascending to nail; a faint groove along side of upper mandible from nasal opening to nail; nail abruptly decurved; serrations acute and directed backwards; frontal feathering usually extends beyond loral feathering but often equal. Nostrils situated about middle of bill. Feathers of occiput in ♂ elongated, in ♀ and eclipse ♂ considerably elongated, forming a well-developed crest, in juv. ♂ and ♀ crest short, in first winter ♂ and ♀ crest shorter than in adult female.



Bills of Goosander (*Mergus m. merganser*) upper, and Red-breasted Merganser (*M. serrator*) lower, to show differences in shape, position of nostril and feathering.

SOFT PARTS.—Bill (ad. ♂) purple-lake, ridge of culmen and nail black; (ad. ♀) as ♂ but duller; (juv. ♂) dark reddish-brown shading to yellow on tomia, lower mandible pale yellow (J. G. Millais); legs and feet (ad. ♂) bright vermilion, webs slightly duller, (ad. ♀) slightly duller and webs brown, (juv.) dull darkish yellow, veined brown, webs ochreous-brown; iris (ad. ♂) very dark sepia, (♀ and juv.) dark brown with very narrow outer ring yellow to pale yellowish-brown. [*A.C.M.* revised by *H.F.W.*]

**Characters and allied forms.**—Goosander is distinguished from other British members of the genus by its large size; green head without long crest of adult male, uniform white under-parts (in life salmon-pink) and in ad. ♀ and young birds bluish-grey upper-parts distinguish it from Red-breasted Merganser in all plumages. *M. m. orientalis* (Afghanistan, Himalaya) is smaller; *M. m. americanus* (N. America) has in ad. ♂ black bases of white greater coverts exposed forming a wing-bar; ♀ and young have upper-parts darker. [*A.C.M.*]

*PLATES 81, 87a, and 92.*

## 343. THE RED-BREASTED MERGANSER—Mergus serrator L.

Mergus Serrator Linnæus, Syst. Nat., ed. x, i, p. 129 (1758—Europe. Restricted typical locality: Sweden).

*Mergus serrator* Linnæus, Yarrell, iv, p. 494; Saunders, p. 473; Pract. Handb., ii, p. 385.

**Habitat.**—In breeding-season frequents clear rivers and large or small lakes both in wooded districts and in treeless fell and tundra regions of the high north, commonly near coast, but also far inland; also regularly about coasts and islands of sea-lochs and inlets. Outside breeding-season a maritime species, generally keeping fairly near land in bays and estuaries; fresh and brackish waters are often visited if available close to coast, and according to Millais a good many winter on lakes, etc., far inland in Scotland and Ireland, but in England is very uncommon on reservoirs or other fresh waters inland. *B.W.T.*

**Field-characters and General Habits.**—General form and habits resemble those of Goosander, though Merganser is a smaller, slimmer-necked bird and is rare on fresh waters inland outside breeding-season. Male is at once distinguished, however, by *chestnut breast, noticeable as dark band even when too far off to see colours, much less white in rest of plumage* (white of wings showing as broad band on sides between black back and vermiculated grey flanks, instead of whole sides being white) and by *noticeable crest,* standing out rather stiffly and distinctly divided into two. Head bottle-green and bill red, as Goosander. Lower neck white, forming collar, a group of white patches regularly outlined by black in front of wing, rump and tail vermiculated grey, belly white. Female is less distinct, but at reasonable range is recognized by *brownish-grey, instead of clear blue-grey, back, and by dingy white throat-patch merging into brown of head, which itself shades off gradually at neck,* whereas in Goosander chestnut of head is sharply demarcated at neck, a difference often quite conspicuous in flight when fairly close, and throat-patch is usually purer white and more sharply defined. Brown of head is also usually paler and duller in Merganser, and *crest though smaller than in drake is similar and stands out quite prominently,* instead of hanging down back of neck in more mane-like fashion as in Goosander. Difference of size is not in itself a very safe character in field when only one or other species is present, but Goosander is in fact considerably larger, being rather bigger than Mallard instead of decidedly smaller. Merganser often moves neck backward and forward in swimming, like Moorhen. In flight male differs from Goosander in dark breast-band and less white in wing, fore-wing being blackish and broad white speculum crossed by two black bands; distinct black band also crosses white speculum of female, this being absent or much less distinct in the female Goosander. The full plumage of the drake is generally complete about end Nov.; moult to eclipse begins early, often late April or May and March specimens in moult examined, but thereafter proceeds slowly and eclipse is only complete from about Aug. to early Sept. (Millais). In eclipse male closely resembles female except for white fore-wing and shorter crest. Juveniles are also very like females except for shorter crest and greyer back. In some young males by late Dec., but in others scarcely before Feb., some blackish feathers begin to come in on head and mantle and vermiculated feathers on flanks, but brown fore-wing is retained and change does not progress far before moult to eclipse (Millais); full plumage not acquired till second year winter. Bill and legs of both sexes red, less bright in female. Length *c.* 23 ins.; body *c.* 14 ins.

Flight, gait, carriage on water and general behaviour as Goosander (*q.v.*). Wings produce slight whistling sound. Feeds by day and often flights at dusk from shallows and inlets where it has been feeding to more open sea, returning at dawn. Phillips considers it less addicted to landing on shore or ice to rest and preen than Goosander, but according to Millais it does this a good deal in spring. Full-grown birds are not often seen in large or close flocks, but even where numerous tend to disperse in parties of about six or eight up to a few dozen, though considerably larger numbers may be seen in close association on migration, while in Ireland and elsewhere remarkable packs of young birds up to several hundred in number in charge of only one or two adults occur regularly between Aug. and Oct. (H. Trevelyan observed up to *c.* 300 and was informed of considerably larger numbers). Males do not appear to flock to noticeable extent while females incubate (Millais). When feeding often swims like Goosander with bill and even part of head submerged on look-out for fish and dives in similar manner. Maximum depth recorded by J. M. Dewar was 18½ ft. and longest dive 45 secs.; most dives were in 6–12 ft.; the observations appeared to indicate that young birds tend to dive in shallower water than adults (mean depth for former 7½ ft., for latter 12 ft.). Phillips found dives ranged from 20–25 secs., average 22 secs., and pause from 15–20 secs., and W. A. Nicholson has recorded submergence for as long as 120 secs. Does not normally use wings under water, but a bird watched from a favourable position chasing fish in clear water opened wings twice in half an hour; the same bird at times flapped along surface with wings and head alone submerged and in this way also apparently obtained food (R. E. Vaughan and K. H. Jones), while swimming in shallows with merely head immersed is a normal method of feeding as with Goosander. As in Goosander "brown-heads" appear to migrate before old drakes and to work farther south. But sexual and age differences in distribution require more attention. On English coasts "brown-heads" are usually much commoner than adult drakes, but in Tay estuary (in contrast to Goosander) numbers are more nearly equal throughout, sometimes one and sometimes the other being slightly in excess. Millais considered immature birds exceptional in Orkneys, Shetlands and Hebrides in winter, though H. W. Robinson records large excess of "brown-heads" in first-named. *B.W.T.*

**Voice.**—Male rarely utters any sound except display-note, described by C. W. Townsend as a loud, rough and purring, slightly double note, rendered as "da-ah" but impossible to express satisfactorily in syllables. O. Heinroth, however, mentions "a low, exhalant, quacking-rattling sound" and C. Oldham a soft cooing note. Female has loud, harsh "kar-r-r" like Goosander's, but also a harsh "quark" when disturbed (C. Oldham). *B.W.T.*

**Display and Posturing.**—Display is more boisterous than Smew's or Goosander's. Essential features of male's performance are stretching upwards of head and neck in line at steep angle, a bowing action, and wide opening of bill with accompanying note and display of red interior of mouth, but the details and way in which actions are combined evidently vary considerably as no two accounts quite agree. Millais defines following phases: (1) Male swims rapidly towards female with chin and head raised to angle of 75°, crest depressed close to neck. (2) On reaching female head and neck suddenly thrown out straight in front and then turned downwards with sudden bow. (3) Quick rise in water and dip. (4) Resumption of normal position, crest fully spread and bill opened to widest extent. C. W. Townsend describes drake stretching head and neck up, at once opening bill, and bobbing stiffly as if on pivot, so that breast and lower part of neck are immersed, while head and neck are brought forward from vertical to angle of 45° and hind part of body swings upward, with arching upward of wings displaying white secondaries. E. Christoleit gives substantially similar description. C. E. Alford says head and neck extended upward with closed bill, then dipped sharply downwards towards water and bill opened. H. R. Colman and H. Boase describe action essentially the same as Townsend's with upthrow of stern, but bill opening coincided with resumption of normal position of head (and was not constant), while erection of crest occurred at same time. They also describe approach to female essentially like Millais's No. 1, but with crest bristling, the birds "skating" over surface with vigorous thrusts of legs, but also refer to alternative method (perhaps more of menace to other males) with head and neck extended in line almost on surface; wings are slightly raised in both cases. Stretching neck upwards with bill pressed close to it was also observed (Millais figures this, but does not clearly describe it) and other variations in detail are described—*e.g.* upward swing of stern accompanied by retraction of neck with head still in line or by backward swing of neck (but not to extent seen in Goldeneye), etc. Bill-opening, which varies in extent, is accompanied by special note (see "Voice"). Female may respond by bobbing like male's but less exaggerated (Townsend) or by mere raising of head and neck in line (Colman and Boase). Display is accompanied by usual chasings and bickerings. (See, especially, Colman and Boase, *Brit. B.*, xviii, p. 313, and Townsend, *Auk*, xxviii, p. 341; display figd. Millais, vol. ii, p. 112, and Phillips, vol. iv, pl. 98.) *F.C.R.J. & B.W.T.*

**Breeding.**—Unlike Goosander, which only breeds by fresh water, this species nests on islands in sea-lochs and firths as well as by lakes and rivers inland. *Nest.*—On ground, sometimes in recess on face of grassy cliff, more often under protection of thicket of brambles, hollow among tree-roots, among boulders, sheltered by long heather or grass, or in shallow burrow. Nest-lining of grass, dead leaves, etc., lined with down, which differs from that of Goosander in being darker, with tinge of brown, small light centres and rather lighter tips. Feathers small (see Plate 87A). *Eggs.*—Usually 7–12, but 13–17 recorded in Brit. Is. and 19 abroad, blunt ovate, stone-drab to greenish-buff, no gloss. Average size of 100 British eggs, 65·56×45·12. Max.: 70·7×44·7 and 64×47·6. Min.: 60·4×42·6 and 65×40·3 mm. Average weight (H. Goebel), 5·6 grams (6·1 to 4·8 gr.). *Breeding-season.*—From last week May onward to early June: exceptionally mid-May. *Incubation.*—By duck only: drake absent. Begins with completion of clutch. Period 29 days (in captivity, A. F. Moody). *Fledging.*—Young tended by duck alone: tendency to pack with one duck attending, where numerous. Period: feathering begins at 16 days: crest showing at 5 weeks (Moody). Single-brooded. *F.C.R.J.*

**Food.**—Almost entirely animal matter, 75% fish, according to W. E. Collinge, on basis of 16 stomach contents: both marine and fresh-water forms. Former include cod and small coal-fish (*Gadidæ*), hake, blenny, pipe-fish, small plaice, sand-smelt (*Atherina*) and sand-eel (*Ammodytes*), latter young salmon, trout, roach, perch, dace, chub, gudgeon, pike, eel (up to 11 ins.) and sticklebacks (3- and 15-spined). Also small Crustacea (15%), including crabs, crayfish, shrimps (*Crangon*), etc.: Annelida (worms), 5%; and insects (5%), including Odonata (larvæ), Lepidoptera caterpillars and Coleoptera water-beetles and cockchafers). Naumann also mentions Mollusca (water-snails), but no vegetable matter. *F.C.R.J.*

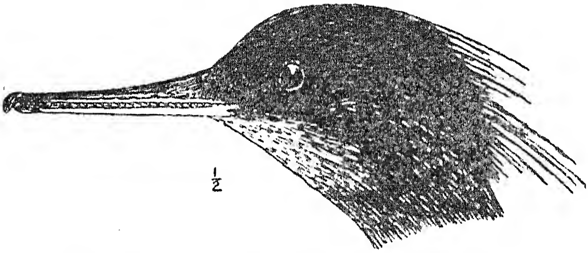
**Distribution.**—*British Isles.*—Resident, passage-migrant and winter-visitor (early Sept.-end Oct. to mid-March-mid-May). Since end of last century has increased and spread considerably and now breeds commonly (salt- and fresh waters) all counties of *Scotland* from Ayr north on W. side and from Aberdeen and Inverness north, as well as Orkneys and Shetlands and I. and O. Hebrides, and breeds sparsely Stirling and S. Perth and more plentiful N. Perth, commonly in Dumfries and fairly so in Kirkcudbright and has bred Wigtown, but not Lanark or counties south of Firth of Forth, nor Clackmannan, Fife, Kinross, Angus, or Kincardine. Breeds commonly many inland and several marine loughs and islands in *Ireland* chiefly in W. half and north, scarce in S.E. quarter but recently established Wexford. Elsewhere fairly common winter-visitor, usually small numbers, to coasts but only infrequently to inland waters. Two ringed as young in Iceland were recovered in Caithness and Inverness in Oct. and Dec. *H.F.W.*

**Distribution Abroad.**—N. Holarctic region. In Europe breeds north to Iceland, Færoes, Norway to 71°, N. Sweden, N. Finland, and Russia (Olonetz, Archangel to N. Urals and Perm Govts., Novaya Zemlya and Yalmal). In Asia, Siberia east to Kamtschatka, Bering Is., and Kuriles. In south to Holland (rare), Denmark, N. Germany, Gothland, Baltic states, E. Prussia, Poland, Russia (Novgorod, Yaroslav, Kostroma, Viatka, Kazan, N. Ufa and even Taurida Govt., and Armenia). Also in N. America from Aleutian Is., Alaska, R. Anderson, N. Ungava and Greenland coasts to Newfoundland, Nova Scotia, Maine, New York, Ontario, Michigan, Wisconsin, Manitoba, and Minnesota to Alberta and N. British Columbia. Winters in Europe south to Mediterranean and Black Seas and N. African coast: also Asia Minor, Palestine, Persia, Aralo-Caspian region, Baraba Steppes, Semipalatinsk, Afghanistan, Baluchistan, and in small numbers to India, China, and Japan. Casual in Madeira and Azores. American birds winter on E. and W. coasts, south to Florida and Lower California. Casual in Bermuda, Cuba, Hawaii, and Pribilof Is. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—*Head* and upper-part of *neck* all round black, sides of face and neck glossed green; small whitish patch below eye; blackish streak down centre of nape; rest of neck white; (*upper-parts*) mantle and inner scapulars black; sides of upper-mantle pink-cinnamon, feathers irregularly marked black; patch of feathers on either side of mantle with large white centres outlined in black; outer scapulars white, some marked black; back and rump vermiculated black and white; upper tail-coverts olive-grey with sepia centres and more or less spotted or vermiculated white; (*under-parts*) fore-neck and upper-breast pink-cinnamon broadly streaked and irregularly spotted black, merging on sides of breast with black of upper-mantle; sides of belly and flanks coarsely vermiculated black and white; remaining under-parts and axillaries white and under wing-coverts mostly white; under primary-coverts pale grey; *tail-feathers* ash-brown, sometimes faintly bordered or vermiculated white; *primaries* brown-black, lighter on inner webs; outer *secondaries* brown-black, paler on inner webs which are mostly marked white towards tip, inner secondaries white with imperfectly concealed black bases forming a wing-bar, innermost white with outer webs narrowly edged black, those next scapulars and their coverts black-brown; outer *greater coverts* black-brown, lighter on inner webs, rest of greater coverts white with black bases forming a wing-bar; *median coverts* white; rest of *wing-coverts* black-brown. This plumage is acquired by a moult of body-feathers and some innermost secondaries from Sept. to Jan.

ADULT MALE. ECLIPSE.—The body-feathers, apparently not back but sometimes an odd feather, not lower-breast, belly, vent, or under tail-coverts, are moulted first, followed by wings and tail from May to Aug. Resembles adult female but distinguished at once by white wing-coverts. *Upper-parts* as adult female, but crest shorter, mantle and scapulars darker, intermixed with brown-black feathers; back as adult male; rump intermixed with ash-brown feathers, some vermiculated white at tip; (*sides of head* and *under-parts*) cheeks and sides of neck, chin, and throat as juvenile male; fore-neck and upper-breast as adult female; feathers of sides of body and flanks as adult female but intermixed with ash-brown feathers coarsely vermiculated whitish; remaining under-parts as in winter-summer; new innermost *secondaries* with outer webs white more broadly bordered black than in winter-summer, inner webs pale ash-grey, innermost secondaries black-brown; rest of *wing* as in winter-summer.[1]

ADULT FEMALE. WINTER.—(*Head* and *neck*) fore-head, crown down to the eye, and elongated occipital feathers snuff-brown, feathers of the fore-part of the crown with blackish shaft-streaks; centre of nape ash-brown, feathers tipped snuff-brown; rest of nape, cheeks, and sides of neck pink-cinnamon or cinnamon; remaining *upper-parts* dark ash-brown or black-brown (back, rump, and upper tail-coverts lighter), feathers tipped or shaded pale olive-grey or buff-brown; (*sides of head*) black patch varying in extent below and behind, and sometimes completely encircling, eye; whitish patch immediately below eye; whitish streak from lores to eye; below this a brownish streak merging with cinnamon-brown of sides of head; (*under-parts*) chin, throat, and fore-neck white more or less suffused pale pink-cinnamon, fore-neck sometimes spotted black; sides of body and flanks ash-brown, feathers tipped buff-brown or white; thighs ash-brown tipped white; remaining under-parts white, lower under tail-coverts with ash-brown centres; *tail-feathers* as male but without vermiculations; *wing* as male but innermost secondaries and coverts dark ash-brown or black-brown, inner webs paler, secondaries near speculum with grey bloom and more or less bordered blackish on outer webs, one next speculum with outer web white towards tip and broadly edged black; white *greater coverts* with blackish bases hardly exposed, in some more or less tipped black-brown; *median* and *lesser coverts* dark ash-brown, sometimes with more or less pronounced ash-grey bloom and faintly tipped buff-brown. This plumage is acquired by complete moult Aug. to Feb. SUMMER.—Very few spring and summer specimens examined; all breeding birds lacked black area round eye, which apparently is only present in Nov.-March; but more material is required before this can be decided.



The Red-breasted Merganser (*Mergus serrator*). Adult female.

NESTLING.—Like that of Goosander, but dark line from gape under eye usually less well defined; cheeks usually more suffused with tawny and less white and upper-parts sometimes rather richer brown (see figure, p. 366, showing relative position of nostril).

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[1] On sides of breast in front of wing there is sometimes a patch of ash-brown feathers shaded pink-cinnamon and more or less vermiculated or marked black-brown or white, and sides of body and flanks are sometimes intermixed with white feathers coarsely vermiculated black-brown; these feathers are subsequently shed and may belong to eclipse plumage or may be acquired during moult from eclipse to winter-summer.

JUVENILE. MALE.—Like adult female, but crest shorter; (*head*) fore-head, crown, and nape buff-brown more or less suffused greyish olive-brown, feathers with black-brown shaft-streaks; *upper-parts* greyer, feathers dark ash-grey with light grey edges and darker shafts; (*sides of head*) no black round eye and whitish streak from loral feathering to eye absent or merely indicated by indefinite buff streak; cheeks and sides of neck paler pink-cinnamon; (*under-parts*) fore-neck and upper-breast pale ash-brown, feathers tipped white; sides of body and flanks and some feathers of vent and some under tail-coverts pale ash-brown, feathers mostly with ash-white tips; remaining under-parts white; *tail* as adult female but tips square; *wing* as adult female but outer web of secondary next speculum sometimes suffused pale grey instead of white. FEMALE.—As male but innermost *secondaries* shorter, dark ash-brown and more or less edged blackish on outer webs, and without or with little indication of grey bloom as in adult female and juvenile male. Also smaller than juvenile male.

FIRST WINTER. MALE.—Very like adult female, but (*head* and *neck*) no black round eye; indistinct buff streak from lores to eye; indistinct brownish streak through eye; sides of neck, chin, and throat as adult female but throat without any black; at sides of *upper-mantle* some dark ash-brown feathers shaded light pink-cinnamon towards centre, sometimes more or less vermiculated or bordered blackish, sometimes one web more or less white; remaining *under-parts* as juvenile but sides of body and flanks as adult female, flanks usually intermixed with dark ash-brown feathers with one web coarsely vermiculated ash-brown and white; *tail-feathers* mostly new and like those of adult female; *wing* as juvenile. Birds in this plumage occur in Dec., Jan., and Feb. The juvenile body-feathers (all feathers of back and rump ?), tail, sometimes some innermost secondaries are moulted from Oct. onwards but not rest of wings. Sometimes some juvenile body-feathers are retained. FIRST SUMMER.—By Jan. or Feb. forward young males commence to acquire blackish feathers on *crown*, *round eye*, and on *chin* and *throat*; new black feathers (sometimes tipped dark ash-brown) appear on *mantle* and *scapulars*; white *scapulars*, or ash-brown scapulars with one web more or less white, are acquired; new *upper tail-coverts* dark ash-grey, some with indications of whitish vermiculations; *upper-breast* as adult male but streaks narrower; *sides of body* and *flanks* intermixed with white feathers coarsely vermiculated dark ash-brown; patch across *shoulder* more clearly indicated; new innermost *secondaries* when acquired have outer or both webs pale ash-white (one next speculum almost white) bordered with black, inner webs pale mouse-grey.

FIRST WINTER AND SUMMER. FEMALE.—As adult female, but *crest* shorter and less abundant; usually no black *round eye* but exceptionally an indication; *wing* as adult, but more worn and abraded. Moult as in male.

FIRST ECLIPSE. MALE.—Apparently as adult eclipse but distinguished by juvenile *wing-coverts* until they are shed.

MEASUREMENTS AND STRUCTURE.—♂ wing 244–259 mm., tail 79–88, tarsus 40–45, bill from point of frontal feathering 53–62 (12 measured). ♀ wing 217–230, bill 48–55. Primaries: 1st narrow, pointed, and rather more than half longest primary-covert, 2nd longest, 3rd equal or 2–4 mm. shorter, 4th 11–15 shorter, 5th 24–31 shorter, 6th 40–45 shorter. Innermost secondaries long and tapering, longest shorter than 6th or 7th primary; in eclipse shorter and less tapering; scapulars long and tapering, in eclipse shorter and with square tips. Tail slightly rounded, 18, occasionally 20, stiff feathers. Bill as in Goosander but less re-arcuate, upper mandible with dorsal line gently declinate to middle. Nostrils near base of bill. Loral feathering extending farther forward on bill than frontal (see fig., p. 367). Well-developed occipital crest, longest in ♂, rudimentary in juv. ♂ and ♀, shorter in first winter ♂ and ♀ than in adult ♀. Other structure as in Goosander.

SOFT PARTS.—Bill (ad. ♂) deep carmine, culmen and nail black, (ad. ♀)

as male but duller, (juv. and first winter ♂) upper mandible reddish-horn, under orange-red; legs and feet (ad. ♂) deep vermilion, (ad. ♀) paler, (juv.) brownish-yellow, webs dull brown, (first winter ♂) orange-red, webs dusky; iris (ad. ♂) carmine, (ad. ♀) duller, (first winter ♂) yellow.

[*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. For differences of Goosander see under that species. Distinguished from Smew and Hooded Merganser by having distal halves of secondaries white. [*A.C.M.*]

*PLATES 81, 91, and 92.*

## 344. THE SMEW—Mergus albellus L.

MERGUS ALBELLUS Linnæus, Syst. Nat., ed. x, i, p. 129 (1758—Europe. Restricted typical locality: Mediterranean, near Smyrna; from the first quotation: Hasselquist's Journey, p. 268).

*Mergus albellus* Linnæus, Yarrell, iv, p. 499; Saunders, p. 475; Pract. Handb., ii, p. 389.

**Habitat.**—In breeding-season frequents lakes and sheltered bays or backwaters of larger rivers in forested country, not ranging beyond tree-limit. Outside breeding-season resorts to rivers, lakes, reservoirs and ponds, and sometimes to floodlands, as well as to estuaries and inlets on coast, but very seldom to open sea. Rather fond of quite small and shallow fresh-water pools which other "saw-bills" would avoid. *B.W.T.*

**Field-characters and General Habits.**—A much smaller and shorter-billed bird than other "saw-bills" except very different Hooded Merganser, which is scarcely more than accidental in Europe. Adult drake attracts attention by *mainly pure white plumage with black patch on face and band from behind eye to nape*. Drooping crest, black centre of back, band on side above flanks and two curved bands at sides of breast are not conspicuous unless bird is comparatively close, and fine grey pencilling of flanks shows only when closer still. In flight shows much more black, presenting pied effect, wings being black with prominent white patch on coverts; two white wing-bars are noticeable only at close range and front one may hardly show. Female and immature birds are quite as characteristic, with *pure white throat and cheeks contrasted with chestnut-red of rest of head*. Back, breast and flanks grey, belly white; small, short bill, high fore-head, small but distinct crest forming peak at back of head. White wing-patch smaller and less sharply defined than in male, but still quite conspicuous. Full plumage of male is complete from about end Nov. to June (Millais), in eclipse male resembles female except for larger size, blacker mantle and more white in wing. Juveniles resemble female, but have white wing-patch more or less obscured by brownish; young males remain very like females till about Dec., when black feathers often begin to show on nape and lores; change, however, has not progressed far when eclipse supervenes, adult plumage being assumed in second winter (Millais). Bill and legs grey. Total length (ad. male) *c.* 16 ins.; body *c.* 10 ins.; female smaller. Females and immature birds are sometimes confused by inexperienced observers with smaller grebes (*i.e.* Black-necked or Slavonian) in winter plumage, but longer body, stouter-based bill, and chestnut, not blackish or dark brown, top and sides of head in Smew should prevent any such confusion.

Shows usual Merganser outline on wing (see p. 220). Flight very rapid, with very quick wing-beats, noiseless. If startled leaps up from the water with almost the agility of Teal. "When going at full speed they swing from side to side, and often shoot down suddenly, close to water" (Millais). Parties fly in oblique lines or Vs. On land walks and even runs with ease for short distances, but with markedly upright carriage. Seldom comes ashore in winter, but in breeding-season they land and perch as freely as Goosander (*q.v.*) and often "lie for hours asleep amongst the stones or on some sand spit or island" (Millais). I have seen them in Lapland sitting on timber boom in river. Ordinarily swims buoyantly, but like its allies sinks body deeper when alarmed. Most commonly seen in parties of half-a-dozen to twenty or so, but sometimes in much larger numbers; E. Christoleit records flock of over 200 flying together in Germany, though they soon split up, and P. Scott records huge number (*c.* 1,000) on Caspian. Often associates with Goldeneye and other duck. An expert diver, submerging with almost startling rapidity. Millais's statement that it dives more vertically than other mergansers is certainly not always correct; sometimes the direction of submergence is very markedly forward and birds come up considerable distance from where they went down. Dive rarely exceeds 15 secs. (Christoleit). Has been said to use wings under water, but this is probably true only of wounded birds. Though exceptions occur is in general decidedly shy, taking wing very readily. In Britain adult drakes, though decidedly rarer on inland waters than "brown-heads," are not very uncommon and in London district are quite regular; in E. Mediterranean, on the other hand, they are very rare, though "brown-heads" are numerous. *B.W.T.*

**Voice.**—A very silent bird. Male has a short hissing whistle (Lilford) and Millais describes a note used in display as a prolonged croak or grunt like "err-err-err-umph." Female has hoarse grating note similar to the "kar-r-r" of its congeners. *B.W.T.*

**Display and Posturing.**—Fullest account of display is by Millais and Lord W. Percy, based on bird at the Zoo, but main actions have been observed by P. A. D. Hollom in winter and early spring on reservoirs in London district. Mode of crest erection is peculiar, front part, consisting of only a few feathers, standing out quite separately from rest. Display usually introduced by drawing back head between shoulders, but this may be preceded by slow movement of head forward "in a pushing manner" (Millais); scapulars and feathers of head and neck may also be raised. Bird next moves head forward and then sedately back till back of head touches shoulders, while body is either sunk (Percy) or fore-part slightly raised (Millais). As head comes forward again bird makes a little rush through water by vigorous paddling either without raising body off water (Percy) or erecting it to a varying extent; at end of this movement when normal position is resumed head and neck may be extended parallel to water. Note uttered as head comes forward, also, according to Millais, during backward movement of head. Hollom observed drawing back of head and erect posture with head held horizontally (or rarely bill pointed upwards), but apparently without the vigorous forward paddling. Both sexes occasionally pointed bill down to water and then raised it to point upwards ("false drink" motion) and female occasionally pressed bill against breast and bobbed upwards several times in quick succession, each bob accompanied by short surge forward. E. Christoleit stresses predilection of displaying parties for formalized "swimming dances" in long zigzags and graceful sweeping curves. Throw-back of head by drake was not observed by Hollom, but is of regular occurrence (Christoleit) and has been seen in London district by L. Parmenter in Mar.; it is possibly only exaggeration of "false drink" motion. Coition was observed by Hollom in mid-Jan., and was of usual duck type, female soliciting in attenuated attitude with head and tail at angles of *c.* 30° and then lowered on to water. Male after coition bobbed, dipped head under water and shook himself, while female performed action as if bathing, but without putting head in water. See, especially, Millais, vol. ii, p. 123 (display figd. facing p. 120), and Hollom, *Brit. B.*, xxxi, p. 106. *F.C.R.J. & B.W.T.*

**Breeding.**—Breeds in immediate neighbourhood of water, whether lakes or rivers, nesting in natural holes of trees when available, but takes advantage of nesting-boxes erected for the purpose. *Nest.*—No nesting-material added except down and feathers and moss. Sprays of down small, very pale grey, with faint white centres: much like those of Goldeneye but lack faint bluish tinge in bulk. Feathers small, whitish-grey (see Plate 91). *Eggs.*—Usually 6–9, 5 also found, and 10, 11, and once 14 recorded, blunt oval or ovate, surface smooth and with some gloss, shell thick and hard, colour cream, to pale buff: bear curious resemblance to those of Wigeon. Average of 107 eggs (49 by H. Goebel), 52·42×37·46. Max.: 58×40·5. Min.: 47·7×34 mm. Average weight of 49 eggs (Goebel), 3·79 grams (4 to 3·4 gr.). *Breeding-season.*—Latter half May and June in N. Finland. *Incubation.*—By duck alone. Period said to be about 4 weeks, but no reliable data. *Fledging.*—Tended by duck. Single-brooded. *F.C.R.J.*

**Food.**—Mainly animal matter, chiefly fish: occasionally a little vegetable matter. Fish, mostly fresh-water species, including young salmon and trout, gudgeon, roach, bleak, loach, minnows, eel (up to 11½ ins.), sticklebacks: also flounder (*Platessa flesus*), sand-eel (*Ammodytes*) and sand-smelt (*Atherina*): small Crustacea (shrimp (*Crangon*), sandhopper, and fresh-water shrimp (*Gammarus*), etc.): fresh-water Mollusca: insects (Hemiptera, Coleoptera (water-beetles)) and not uncommonly frogs. Some grass and other vegetable matter. *F.C.R.J.*

**Distribution.** — *British Isles.* — Scarce winter-visitor (mid-Sept., usually mid-Nov. onwards to end March, occasionally April and early May). Occurs most parts *England* usually in small numbers and somewhat irregularly, rather more often in estuaries and on inland waters than coasts and more numerously and widely in hard winters. On reservoirs in Essex, Middlesex, and Surrey has been regular visitor in some numbers in recent years, and from Norfolk southwards on E. side and parts of S. side fairly regular in small numbers, but in *Wales* only occasional (but fairly regular Glamorgan), also very scarce and irregular in northern England (though fairly regular Cheshire). In *Scotland* scarce and occasional visitor to most parts, and not recorded N. mainland. In *Ireland* rare and occasional visitor chiefly to Leinster and Ulster. *H.F.W.*

**Distribution Abroad.**—N. Palæarctic region. In Europe breeds only in Norway (E. Finmark), N. Sweden, N. Finland, Russia (east to Perm Govt. and south to Novgorod, Tula, Voronezh, Astrakhan and Ufa Govts.), also

Romania (Dobrogea), ? Bulgaria. In Asia east to Kamtschatka and Anadyr, south to Semipalatinsk. Winters south over Europe to Mediterranean Is. and Black Sea: also occasionally N. Africa east to Egypt: in Asia from Asia Minor and Palestine to Iraq, Persia, Aralo-Caspian region, Turkestan, Baluchistan, N. India, and Japan. Recorded Novaya Zemlya. *F.C.R.J.*

**Description.**—ADULT MALE. WINTER.—(*Head* and *neck*) head, including part of crest and neck all round white; irregular patch of black glossed dull green on lores encircling eye; dark green streak on side of hinder-crown, elongated feathers of which contribute to occipital crest; (*upper-parts*) upper-mantle white; semicircular narrow black band extending across mantle on to breast, another in front of wing; rest of mantle black; scapulars mostly white, long ones with outer webs narrowly bordered black, lower scapulars dark ash-grey, sometimes narrowly edged white; back and rump black-brown, sometimes patch on either side of lower-rump dark ash-brown more or less vermiculated ashy-white; lower-rump and upper tail-coverts dark ash-brown; (*under-parts*) sides of body and flanks white finely vermiculated dusky-brown; remaining under-parts including axillaries white; under wing-coverts white, those at edge of wing dark ash-brown; *tail-feathers* dark ash-grey; *primaries* sepia, outer webs black-brown; *secondaries* sepia broadly tipped white, outer webs black, secondary next innermost with outer web white, narrowly bordered black, innermost ash-grey, sometimes shading to sepia on inner web, sometimes with outer web narrowly bordered white; *primary-coverts* and *bastard-wing* as primaries; *greater coverts* as secondaries but inner ones with outer or both webs white; *median coverts* white; rest of *wing-coverts* blackish-grey or black-brown, those at bend of wing and often lesser coverts more or less tipped white. The body-feathers and innermost secondaries are moulted from autumn to Dec.

ADULT MALE. ECLIPSE.—The body-feathers (all ?) are first moulted followed by wings and tail in autumn. Very like adult female but easily distinguished by larger size, black on mantle and larger white patch on median coverts. *Head* and *neck* as adult female, but crown and crest tinged buff-brown; no black patch on lores or encircling eye, these areas cinnamon-brown; (*upper-parts*) centre of upper-mantle intermixed with blackish feathers; small patch at sides of lower-rump dark ash-brown more or less vermiculated ashy-white as in winter; *under-parts* as female; *wing* as winter but new innermost secondaries with inner webs sepia, outer webs faintly bordered blackish-grey. (Only one examined.)

ADULT FEMALE. WINTER.—(*Head* and *neck*) fore-head, crown, region behind the eye, and centre of the nape cinnamon-brown; lores and region below the eye brown-black, merging below eye with cinnamon-brown of cheeks; nape bordering mantle mouse-grey more or less suffused buff-brown; (*upper-parts*) mantle, back, rump, and upper tail-coverts blackish mouse-grey, feathers mostly with deep grey edges; scapulars dark ash-brown more or less suffused buff-brown at tip, many with deep grey tips; (*under-parts*) upper and sides of breast ash-grey or ash-brown more or less concealed by long white tips of feathers; sides of body and flanks mouse-grey, feathers more or less tipped greyish-white or greyish-buff, some vermiculated white towards base, remaining under-parts white; *tail* as male; *wing* as male, but innermost *secondaries* sepia or black-brown, outer webs sometimes more or less frosted dark grey; *secondaries* and *greater coverts* usually with narrower white tips and white patch on *median coverts* much less extensive. This plumage is acquired by complete moult in autumn and winter; very little moulting material examined. SUMMER.—Only a few birds examined; none in moult. Coloration apparently as winter.

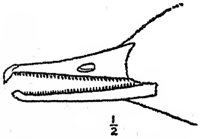
NESTLING.—(Not examined.) H. E. Dresser describes one as having whole upper-parts, and extending on to sides of head to below eye, dark blackish-brown, darkest on crown and lower part of back; at base of wing-joint a white spot, and another close to it, but rather lower down back; on each side of rump another white spot; below eye a very small white spot; under-parts white, but breast and flanks pale greyish or sooty-brown.

JUVENILE. MALE AND FEMALE.—Like adult female but easily distinguished by ash-brown tips to white wing-coverts; (*head* and *neck*) head and nape rather paler cinnamon-brown; no black patch on lores or encircling eye, these areas cinnamon-brown; (*upper-parts*) upper-breast pale ash-brown, feathers tipped white; sides of body and flanks dark ash-brown, feathers more or less tipped ashy-white; vent sometimes intermixed with ash-brown feathers; under tail-coverts sometimes barred and marked ash-brown; *tail* as female but structure juvenile; *wing* as adult female, but *secondaries* and *greater coverts* usually with rather broader white tips; white *median coverts* more or less suffused and tipped ash-brown, amount of white on median coverts varies individually. Juvenile males may be distinguished from juvenile and adult females by their larger size; juvenile females have innermost secondaries shorter and darker than in juvenile males, one next speculum without indication of greyish frosting as in juvenile male.

FIRST WINTER. MALE.—Like adult female in coloration but (*head*) occipital feathers shorter, less elongated; no black patch on lores or encircling eye, these areas cinnamon-brown sometimes intermixed with brown-black; remaining *upper-parts* as adult female but scapulars with lighter mouse-grey centres; (*under-parts*) sides of body and flanks intermixed with white feathers vermiculated and tipped mouse-grey; remaining under-parts and tail as adult female; *wing* as juvenile. Most of the body-feathers (back and rump ?), not always all feathers of breast, belly and vent, tail, in some innermost secondaries, but not rest of wings are moulted from Nov. onwards. FIRST SUMMER.—Forward young males acquire some white feathers on *crown*, *lores* and *patch below eye* are mostly black; black bands across *breast* and in front of wing in adult male, indicated by white feathers vermiculated ash-brown and with subterminal blackish bars; *scapulars* mostly white with ash-brown centres or tips, some white with outer webs bordered blackish as in adult male.

FIRST WINTER. FEMALE.—As adult female but *lores* and *cheeks* cinnamon-brown instead of black; white *median coverts* more or less suffused and tipped ash-brown. The juvenile body-feathers (all feathers of back and rump and all under-parts ?), tail, not innermost secondaries in birds examined (though in one May specimen one innermost secondary seems new) are moulted but not rest of wings. *N.B.*—Sometimes some juvenile feathers, especially on under-parts, are retained. FIRST SUMMER.—Apparently as first winter and probably no moult but little material available.

MEASUREMENTS AND STRUCTURE.—♂ wing 192–205 mm., tail 71–76, tarsus 30–32, bill from point of frontal feathering 28–30 (12 measured). ♀ wing 178–186, bill 25–28. Primaries: 1st narrow, pointed, and about half longest primary-covert, 2nd and 3rd about equal and longest, 4th 8–11 mm. shorter, 5th 19–23 shorter, 6th 31–38 shorter. Innermost secondaries of moderate length tapering to an obtuse point, longest shorter than 6th to 8th primaries. Scapulars of moderate length and with slightly rounded tips, in eclipse plumage shorter. Tail with 16 feathers. Bill rather shorter than head, considerably higher than broad at base, rather stout compared with Goosander; upper mandible with dorsal line declinate nearly to nail, groove on side of upper mandible absent; serrations numerous, fine, and conical. Nostrils large, oval, and situated near middle of maxilla. Head of adult male with a frontal and occipital crest, ad. ♀ with an occipital crest, juv. ♂ and ♀ crest rudimentary. Other structure as in Goosander.



Bill of adult male Smew (*Mergus albellus*).

SOFT PARTS.—Bill (ad. ♂) plumbeous, nail greyish-white, (ad. ♀) dark lead-grey tinged greenish laterally, nail whitish; legs and feet (ad. ♂) plumbeous, (ad. ♀) paler and tinged green, webs black; iris (ad. ♂) bright red, (ad. ♀) reddish-brown. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Short stout bill, small size, black-brown secondaries tipped white distinguish this species in all plumages from other British species of genus *Mergus*. [*A.C.M.*]

*PLATES 91 and 92.*

## 345. THE HOODED MERGANSER—Mergus cucullatus L.

MERGUS CUCULLATUS Linnæus, Syst. Nat., ed. x, i, p. 129 (1758—America).
*Mergus cucullatus* Linnæus, Yarrell, iv, p. 509; Saunders, p. 477; Pract. Handb., ii, p. 393.

**Habitat.**—Differs rather markedly from that of other mergansers. In breeding-season resorts to quiet lakes and pools surrounded by woods, flooded forests and woodland swamps adjoining great rivers of interior of N. America, as well as slow streams, mill-ponds, etc. At other seasons frequents similar haunts, as well as creeks and ponds of large marshes, resorting to swifter streams when other places are frozen. Very rarely on salt-water. *B.W.T.*

**Field-characters and General Habits.**—Size only slightly exceeds that of Smew. Male "black and white, *with a fan-shaped white crest* on the head; breast white with two black bars in front of the wing, wing dark with a white patch; flanks brownish." Female "recognized as a merganser when close at hand by the narrow, spike-like bill, and in flight by the long-drawn appearance of the bird with bill, neck, head, and body held in a horizontal straight line." Distinguished from females of Goosander and Red-breasted Merganser "by the *small size, dark coloration, dark head and neck* and buffy crest" (R. T. Peterson). Head and neck of drake black except for crest, which has narrow black border, back black, long inner secondaries black with white shaft-streaks, belly white. Instead of having basal half of wing white or mainly so as in the larger species, has grey fore-wing and white speculum crossed by narrow black band. Female has head and upper-parts dark brown, with buff crest and whitish throat and wing much like male. Full plumage of adult drake usually complete in October; there is a semi-eclipse plumage in summer, in which the head and neck become largely mottled with brownish and the breast and flanks resemble those of female (A. C. Bent). Juveniles resemble adult female, but upper-parts not so dark and crest smaller; young males remain very like females through first year with only slight changes towards maturity in spring, and do not acquire approximately full plumage till following Nov. or Dec. or even later (Mar.-April according to Bent). Bill black, edged orange in female, legs of male yellowish-brown, of female more dusky. Total length *c.* 18 ins.; body *c.* 12 ins.

Flight described as extremely rapid with very quick wing-beats, sometimes with sharp and abrupt changes of direction; often on the wing, "constantly buzzing about up and down creeks and across marshes all the day long" (Phillips). Swims lightly, but, like its allies, sinks low in water when alarmed. Parties usually consist of five or six up to ten or a dozen, seldom more, while pairs and single birds are also common. Mainly, if not entirely, diurnal. Feeds a great deal in shallow water and most dives appear to be short (Phillips). Rarely associates with other species. According to Phillips males apparently stay somewhat farther north during cold season than females and immatures. *B.W.T.*

**Voice.**—A very silent bird. Note of male, apparently mainly confined to courtship, is described as a very guttural purring (F. Harper) or as a prolonged, rolling, frog-like "o-o-o-o-o-oc" or "kr-r-r-r-r-r" (W. Brewster). Female has harsh note much like other diving ducks; low croaking or churring notes heard in autumn and a "ca-ca-ca-ca" when flying about among nesting-sites are also mentioned (Brewster). *B.W.T.*

**Display and Posturing.**—In display male's head is erected whole time. Main action is throwing of head far back and almost instantaneous return in a sweeping and graceful motion, note being delivered on forward movement while beak about vertical; on completion of movement bird propels itself suddenly forward for about 15 ft. (W. H. Robb). F. Harper observed in addition to throw-back, raising of head several times in succession with feathers of sides of head appearing puffed out, dipping bill in water about three times followed by rearing up on water with or without wing-flapping. Tail was kept slightly upturned and somewhat spread and head was often turned repeatedly at right angles in approaching female. *F.C.R.J. & B.W.T.*

**Breeding.**—Nests in holes in trees growing in flooded areas adjoining great rivers, on shores of lakes and in swamps containing old and dead trees. *Nest.*—Usually inside a hollow tree or stump or in a hole of any kind, sometimes open from above at any height: also exceptionally in hollow among roots of tree and in nesting-boxes or in a hollow fallen log. Little nesting material beyond down and feathers: occasionally a little moss and many chips of dead wood. The down is very delicate and soft, very pale grey, centres perhaps a little lighter. Feathers small, greyish and white (see Plate 91). *Eggs.*—Usually 9–12, but 5–8 recorded, and it is said to lay up to 18: very broad oval, almost approaching spherical at times: pure white, smooth and very glossy, with extremely thick and hard shell. A. C. Bent gives average of 116 eggs as 53·5×44·9. Max.: 57·5×45·2 and 55·5×45·5. Min.: 50×43 and 50·5×41·5 mm. 57 eggs measured by writer agree closely, 53·9×43·7 mm. Average weight, 9·2 grams (10·1 to 8·3 gr.). *Breeding-season.*—Last weeks of April and May to early June. *Incubation.*—By female only. Period: only information from an old table by Owen quoted by W. Evans, "31 days." Confirmation required. *Fledging.*—Young tended by duck only. Evidence of method of reaching water from nest by young insufficient. See Bent, *Life Histories of N. American Wild Fowl, Anseres* (pt. 2), p. 26. Single-brooded. *F.C.R.J.*

**Food.**—Mainly animal matter: A. C. Bent considers largely insects (Odonata nymphs, Trichoptera larvæ, Coleoptera, etc.): other writers give fish as principal food (small char and sand-eels recorded), also Crustacea (crayfish, etc.), Mollusca (water-snails, etc.), and Amphibia (frogs and tadpoles). Some vegetable food also taken: seeds, grain, and aquatic plants. F. H. Yorke records *Limnobium, Myriophyllum, Callitriche,* and *Utricularia.* *F.C.R.J.*

**Distribution.**—*British Isles.*—Very rare vagrant. Four fully authenticated, *viz.* young male Menai Strait (N. Wales), winter 1830–31; pair Queenstown Harbour (Cork), Dec., 1878; female Shannon Estuary (Kerry), Jan., 1881. Single birds also *said* to have been taken Dingle Bay and Tralee Harbour

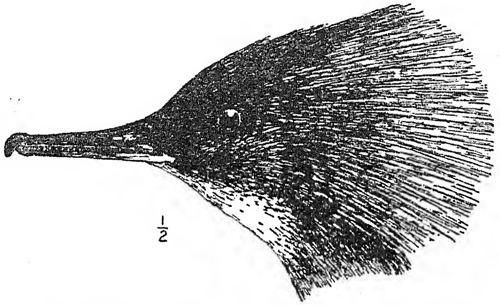
(Kerry), Knockdrin (Westmeath), and near Sligo, also Norfolk (winter, 1837–38), near Cheltenham (Gloucester) March, 1909, two in Merionethshire, 1864, and a male was seen Menai Strait, Mar., 1911. *H.F.W.*

**Distribution Abroad.**—A Nearctic species, breeding from N. British Columbia, central Alberta, Manitoba, S. Ontario and New Brunswick to New York, central Pennsylvania, S. Carolina, central Florida, S. Tennessee, N. Arkansas, N. New Mexico, Oregon, and Washington. Winters chiefly in southern states, south to Cuba and Mexico. Accidental in Bermuda and Alaska (*cf. A.O.U. Check-List*, 4th Edit.). *F.C.R.J.*

**Description.**—ADULT MALE. WINTER AND SUMMER.—(*Head* and *neck*) fore-head, crown, and top part of crest dark fuliginous-brown merging with black of rest of head; semicircular occipital crest chiefly white, broadly tipped black, white extending from a little way behind eye; rest of head and neck black; cheeks and sides of neck glossed dark green; (*upper-parts*) centre of mantle, back, and rump black-brown merging to black at sides of mantle; broad crescent-shaped band of black extending from upper-mantle to breast and separating two white semicircular bands extending from breast on to mantle, a narrow black crescent-shaped band in front of wing; scapulars black; lower-rump and upper tail-coverts sepia more or less with a dark grey bloom and narrowly edged buff-brown; (*under-parts*) sides of breast light pink-cinnamon deepening to cinnamon on sides of belly and flanks, feathers finely vermiculated black-brown, vermiculations coarser on flanks; rest of under-parts white, sides of vent and under tail-coverts more or less mottled sepia; axillaries and under wing-coverts white, coverts at edge of wing more or less sepia; *tail-feathers* sepia with an ash-grey bloom and more or less narrowly edged brownish-white; *primaries* and *secondaries* sepia, primaries paler on inner webs, middle secondaries with distal halves more or less edged with white on both webs, imperfectly concealed basal halves with outer webs black or black-brown forming a wing-bar, one next innermost with a broad white streak on outer web along shaft, rest of web black, innermost secondaries black with broad white shaft-streaks (merely indicated on innermost); all *primary-coverts* and *bastard-wing* as primaries; *greater coverts* black-brown, middle ones with outer webs black and broadly tipped white; *median coverts* drab-grey, innermost black-brown; *lesser coverts* sepia or black-brown, those at edge of wing more or less edged drab-grey. No moulting examples examined.

ADULT MALE. ECLIPSE.—(Not examined.) A. C. Bent states that there is a semi-eclipse in which head and neck become largely mottled with brownish and breast and flanks lose their brilliant colours and resemble those of female.

ADULT FEMALE. WINTER AND SUMMER.—(*Head* and *neck*) fore-head and crown buff-brown shading to dark hair-brown on hinder-crown; occipital crest cinnamon or cinnamon-brown, paler towards tip; chin and throat white sometimes feathers faintly spotted or tipped hair-brown; rest of head and neck all round hair-brown; (*upper-parts*) mantle and scapulars black-brown, feathers shading to olive-brown towards tip; remaining upper-parts as male; (*under-parts*) upper and sides of breast and sides of belly hair-brown, feathers with ashy-white or buff-brown tips; remaining under-parts and *tail* as male; *wing* as male, but innermost *secondaries* not so long and tapering and with narrower white shaft-



The Hooded Merganser (*Mergus cucullatus*). Adult female.

streaks, absent on inner ones, inner webs black-brown ; *median coverts* hair-brown with lighter edges.

NESTLING.—Crown down to eye, nape, and upper part of mantle sepia ; remaining upper-parts black-brown ; a small white patch across wing, another on either side of centre of back and at base of uropygial tuft ; sides of face buffish-white, chin, throat, and rest of neck white ; fore-neck and upper-breast dingy brownish, sides of body sepia ; remaining under-parts dingy white.

JUVENILE. MALE.—(Not examined.) Apparently like juvenile female.

JUVENILE. FEMALE.—As adult female but *crest* shorter, *upper-parts* lighter, dark sepia rather than black-brown ; feathers at sides of upper-mantle, some scapulars, feathers of *sides of body* and *flanks* margined with buff-brown ; *wing* as adult female but innermost *secondaries* with inner webs sepia and with less pronounced white shaft-streaks ; middle *greater coverts* with less white which is confined to an oval marking on outer webs.

FIRST WINTER. MALE.—Like adult female, but (*upper-parts*) at sides of upper-mantle extending on to breast a patch of black intermixed with hair-brown feathers, vermiculated ashy-white at tip, this patch separating two whitish patches, feathers more or less freckled dusky extending from upper-breast on to upper-mantle ; feathers in front of wing more or less tipped black ; some scapulars brown-black, rest of upper-parts as adult female ; (*under-parts*) cheeks, chin, and throat intermixed with blackish feathers ; upper-breast bordering fore-neck white, feathers more or less mottled dusky-brown towards tip ; sides of body and flanks hair-brown more or less coarsely vermiculated pinkish-cinnamon ; rest of under-parts and new *tail-feathers* as adult male ; *wing* as juvenile. Most of the body-feathers, some (all ?) tail-feathers, apparently some innermost secondaries but not rest of wings are moulted from Sept. onwards. Very little material examined.

FIRST WINTER. FEMALE.—Apparently as adult female but distinguished by juvenile wing. No moulting material examined.

MEASUREMENTS AND STRUCTURE.—♂ wing 195–201 mm., tail 80–93, tarsus 29–31, bill from point of frontal feathering 38–41 (12 measured). ♀ wing 184–198, bill 35–39. Primaries : 1st narrow, pointed, and little more than half longest primary-coverts, 2nd and 3rd about equal and longest, 4th 7–10 shorter, 5th 17–22 shorter, 6th 29–35 shorter. Innermost secondaries long and tapering, longest shorter than 4th–6th primary. Scapulars of moderate length and more or less pointed at tip. Tail with 18 feathers. Bill shorter than head, higher than broad at base ; dorsal line of upper mandible gently declinate for half its length then direct to nail, more depressed terminally than in Goosander ; serrations as in Smew but coarser. Nostrils situated near base of bill. Other structure as in Goosander.

SOFT PARTS.—Bill (ad. ♂) deep black, (ad. ♀) black edged with orange ; legs and feet (ad. ♂) yellowish-brown, claws dusky, (ad. ♀) dusky ; iris (ad. ♂) bright yellow, (ad. ♀) hazel. [*A.C.M.* revised by *H.F.W.*]

**Characters.**—No subspecies. Middle secondaries with white confined to border of outer webs distinguish this species in all plumages from other British species of genus *Mergus*. [*A.C.M.*]

# INDEX OF ENGLISH NAMES USED IN VOLUME III.

Birds mentioned in notes and not admitted to the British List are included in this index and are printed in italic type, while the names used by us for the birds in the List are printed in ordinary type. Page numbers in *italic* type indicate the page opposite which a coloured plate of the bird appears.

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This index does not include any synonyms, which will be given in a fuller index at the end of the whole work. The names of birds mentioned in notes but not admitted to the List are printed in ordinary type, while the names used by us for birds on the List are printed in italic type.

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